**WEIGHT INDICATOR**

# FT-03

*TECHNICAL MANUAL*

Flintec GmbH
Bemannsbruch 9
74909 Meckesheim
Germany
Tel. +49 6226 92400
Fax. +49 6226 924099
www.flintec.net
germany@flintec.net

This manual contains proprietary information, protected by international copyright laws. No part of this document maybe reproduced without the written agreement of the publisher, FLINTEC GmbH.

The information herein is believed to be both accurate and reliable. FLINTEC GmbH, however, would be obliged to be informed if any errors occur. FLINTEC GmbH cannot accept any liability for direct or indirect damages resulting from the use of this manual.

FLINTEC GmbH reserves the right to revise this manual and alter its content without notification at any time.

# Table of Contents


Safety information ... 3
**General** ... 3
1 INTRODUCTION ... 4
2 INSTALLATION ... 5
2.1 Mounting ... 5
2.2 Wiring ... 5
2.3 Power ... 5
2.4 Load cells ... 5
3 SPECIFICATIONS ... 6
3.1 Environmental And Electrical Considerations ... 6
3.2 Technical Specifications ... 7
4 FRONT PANEL DESCRIPTION ... 9
4.1 WEIGHT AND OPERATOR DIALOGUE DISPLAY ... 9
4.2 KEYBOARD DESCRIPTION ... 9
4.3 MENU STRUCTURE ... 11
5 SYSTEM OPERATIONS ... 12
5.1 DATE-TIME-SERIAL PRINT NUMBER EDIT (DATE) ... 12
5.2 PIN - PASSWORD PROTECTION SYSTEM (PIN) ... 12
5.3 PROCESS PARAMETERS (PRP) ... 13
5.4 SCALE CALIBRATION (1CAL, 2CAL) ... 13
5.4.1 CALIBRATION SECURITY ... 13
5.4.2 CALIBRATION PROCEDURES ... 13
5.4.3 SCALE PARAMETERS (PAR) ... 14
5.4.4 WEIGHT CALIBRATION (ZERO & SPAN) ... 16
5.4.5 ELECTRONIC CALIBRATION (ZERO & SPAN) ... 16
5.4.6 INIT ... 17
5.4.7 WRITE ... 17
5.5 ANALOGUE OUTPUT (D/A CAL) ... 17
5.6 SYSTEM PARAMETERS SET UP (SET) ... 19
5.6.1 OPERATIONAL (OPER) ... 19
5.6.2 SERIAL PORTS (1COM,2COM) ... 20
5.6.3 INIT ... 21
5.6.4 TICKET FORMATS (FORM) ... 21
5.6.5 REFERENCE CODES (REFR) ... 22
5.6.6 TILT SWITCH (TILT) ... 23
5.6.7 SETPOINTS (SETP) ... 23
5.6.8 TEST UTILITIES (TEST) ... 24
6 COMMUNICATION PORTS ... 25
6.1 SERIAL COMMUNICATION PORT 1. (RS232C) ... 25
6.2 SERIAL COMMUNICATIONS PORT 2 (RS485) ... 26
6.2.1 WEIGHT OUTPUT ... 26
6.2.2 REMOTE PRINTER MODE (R. PRN) ... 27
6.2.3 EDP PROTOCOL OUTPUT (EDP) ... 27
6.2.4 MASTER / SLAVE NETWORK ... 29
7 ERRORS ... 30
7.1 ERRORS DUE TO HARDWARE ... 30
7.2 OPERATIONAL DATA ERRORS ... 30
7.3 PRINTER - PROTOCOL ERRORS ... 30
7.4 WEIGHING-PIECE COUNT-ALIBI MEMORY ERRORS ... 31
8 OPERATIONS ... 32
9 MAINTENANCE ... 33
9.1 SERVICE ... 33

ANNEX A containing installation schematic drawings and ADDITIONAL FEATURES (page 34- 58)

# Safety information

### General

All products of this series are developed, manufactured and tested in accordance with the applicable industry safety standards. If these products are properly installed, operated and maintained according to the applicable technical instructions, drawings and specifications, no hazard exists in the normal and intended use of these products.

### General Safety Guidelines

The following general safety guidelines apply to all Flintec - products:

- All applicable safety and accident prevention recommendations must be observed VDE 0100 and VDE 0113).
- All installation, start-up and maintenance work must be carried out by **qualified service personnel** only.
- An easily accessible power outlet must be located close by for devices equipped with a main power cord and plug.
- An easily accessible MAIN POWER ON/OFF switch must be provided for equipment with permanent electrical connections.

## Electrical Safety

### Line Voltage Equipment

The following safety guidelines apply to the FT - models:

- This equipment contains components which operate on hazardous voltages. Physical contact with these components can cause electrical shock!
- Before removing the equipment's protective housing, always disconnect its power plug from the power outlet or switch off the main power to the equipment.
- This equipment must be connected to a protective earth conductor.
- Before placing the equipment into operation, make sure the actual voltage supply at the installation site is the same as the rated voltage range indicated on the equipment's serial no. plate.

# 1 INTRODUCTION

The electronic weighing terminal model FT-03 is a compact microcontroller based unit specifically designed for use on systems utilising strain gauge load cells. It offers excellent weighing performance, protocol printouts with administrative data handling.

The standard configuration includes:

1. High accuracy analogue to digital converter (max 550.000 internal counts).
2. Front panel with 16 character (14.5mm height) LCD display module for weight indication and operator dialogues, 27 membrane type keyboard with tactile feedback.
3. 32 Kbytes flash RAM, real time clock and non-volatile memory for system parameters and
4. calibration data.
5. Flash memory for storage of 10.000 weights (Electronic tally roll or Alibi memory).
6. 2 serial ports RS232C / RS485A for connection to printers, computers, remote displays.
7. 2 setpoints 24VDC/100mA optoisolated and 1 optoisolated input.
8. The microcontroller technology allows the instrument to perform in software all measuring functions,
   operator input-output, automatic controls and sequences necessary for the operation of weighing systems.
9. The unit incorporates internal diagnostics, which alarm hardware failures operational data corruption, and programming errors. During entry all system and operational variables are validity checked with appropriate error indication. During operation these values are continuously being checked. The type of error is indicated on the display.
10. Administrative data maybe programmed to be included in the weighing dialogue. Four programmable print formats are available selectable in set up, user programmed or default.
11. The standard software enables weighing ticket protocols to be processed utilising The weighing file stores up to 250 mixed first weighing or fixed tare weights, date/time print serial no and 2 reference codes.
12. A piece count facility with selectable sample size is included in the standard software.
13. The unit may be connected to a printer to produce reports of weighing protocols and data files. The protocols printed may also be transmitted to a host computer. Both printer and host interface can be active at the same time.

OPTIONS

a. 2nd analogue load cell input board (PCB 765).
b. Analogue output 0/4 - 20mA or 0-10V, 16 bits resolution remotely powered.

**EXTENT OF SUPPLY**

A. The standard supply includes:
   - The connection plugs for the load cell cable and peripherals.
   - This manual.

B. Prior to unpacking the equipment, examine the carton for exterior shipping damage and if any notify the carrier immediately. Remove the equipment from the carton and plastic bag.
   Inspect extent of supply for any sign of damage. Save packaging material.

# 2 INSTALLATION

## 2.1 Mounting

The mounting location must be such that the instrument is not subject to excessive vibrations, heat or humidity. Avoid direct sunlight on the front of the instrument. The unit has to be installed at the right height to allow an easy reading of the display and keyboard operation.

## 2.2 Wiring

Use load cell cable 6 x 0,5 $mm^2$ shielded for the sensor. Use 3 x 0,34 $mm^2$ shielded for RS232C connection and 2x0,34 $mm^2$ twisted pair and shielded for RS485 connection.

***Table top***

All connections to the instrument are made through the rear panel connectors. Strain reliefs are supplied with the connectors. The shield should be connected to the metal frame of the connector.

***Stainless steel***

- Remove the rear panel and lift it carefully.
- Insert cables via the cable glands. Strip and connect cables according to connector diagram in Annex
- Connect the shields of the cables between the plastic part and metal case of cable glands or on screws supporting the pcb's.
- Re-install the rear panel.

## 2.3 Power

The instrument is powered from external power supply 85 – 260 VAC / 50-60 Hz / 10 VA or battery
As the instrument is computer controlled it requires clean power for reliable operation.
Power supplied should come from a source that is isolated from other process equipment.

## 2.4 Load cells

| | |
|---|---|
| CONNECTION : | Connect according to the junction box drawing. |
| MAX. CABLE : | 300 m / cross sectional area of cable ($mm^2$) |
| UTILISATION : | A -0.25 to 2.0 mV/V range is permitted (dead load inclusive) with GAIN=10 mV or a -0.25 to 4.0 mV/V is permitted with GAIN=20mV. The load cells must be chosen so that the input signal to the controller is at least 0,4µV per scale increment. For load cell output less than 0,4µV/digit the controller will still be stable but the full temperature range accuracy is not guaranteed. |
| CONVERSION : RATE | This parameter allows the user to adjust internal speed of the A/D converter. It is normally set to 14 for static weighing applications or to 57 for dynamic weighing applications. |
| LOAD CELL : EXCITATION | 5 VDC, fixed or alternating polarity (Setup selectable) for 10 load cells of 350 Ω each. |

**CAUTION :** ***Do not run signal cables together with power cables.***
***Connect the shielding where indicated on the drawing only.***
***Never use plastic insulating tape on load cell connections.***
***Be sure the AC power socket outlet is properly protected for optimum EMC performance, keep the length of shield inside the enclosure as short as possible.***

# 3 SPECIFICATIONS

## *3.1 Environmental And Electrical Considerations*

| | | |
|---|---|---|
| AMBIENT | : | Storage -10 to +70 $^0$C. |
| TEMPERATURE | | Operating -10 to +40 $^0$C. |
| HUMIDITY | : | 40 to 90% RH (non condensing). |
| VIBRATION | : | Severe vibration can affect the accuracy of weighing and damage electric / electronic components. |
| AIR: | | The surrounding air should be dust free and not contain any corrosive gasses or materials which could adversely affect the equipment. |
| PROTECTION: | | IP40 for table top or IP65 for stainless steel. |
| ELECTROMAGNETIC : FIELDS | | Heavy electrical equipment should not be installed close to the weighing equipment. |
| INCOMING AND: OUTGOING SIGNALS | | Relays and contactors connected to the equipment must have reliable and effective interference suppression. This also applies to other equipment located within a distance of 3m from out equipment. Cabling must beperformed according to normal practice. |
| NOTES | | WELDING on or in the vicinity of the equipment is strictly prohibited. STATIC loads, caused by thunderstorms, have to be prevented from developing by use of reliable lightning conductors. ENSURE that the cooling of the equipment is not obstructed. |

## *3.2 Technical Specifications*

| | |
|---|---|
| CPU CHARACTERISTICS | MCU 89C51RD, 64KB Flash ROM, 1KB RAM, 64KB serial EEPROM Real time clock. |
| SELF DIAGNOSTICS | Hardware and Software, MCU watchdog. Memory failure, I/O failure, program check. |
| COMMUNICATION | SERIAL PORT 1:RS232C Full duplex. 2400 baud, 1 start, 7 data/even parity or 8 data/no parity , printer, weight output.<br>SERIAL PORT 2:RS485 half duplex. 2400-57600 baud, No or Even Parity, 7 or 8 data bits. Master/Slave protocol, remote printer, EDP output, weight output interface selection. |
| DISPLAYS | 16 character LCD display (14.5mm height). |
| KEYBOARD | 27 key membrane type with tactile feedback. |
| APPROVALS | EU type approval 10.000 divisions, DK 0199.37 & OIML R76. |
| ACCURACY CLASS | III |
| RESOLUTION | Selectabe up to 990.000 dd (in accordance with regulations). |
| MAX TARE EFFECT | - Max |
| AUTO ZERO TRACK | Off or 0.5 dd setup selectable. |
| WEIGHT DIGITS | 4,5,6 |
| WEIGHT STEPS | 1, 2, 5, 10, 20, 50,100,200 |
| DIGITAL FILTER | FIR automatically adjusted to conversion speed, plus post Filtering (Rolling average 1, 2, 4, 8, 16, 32 samples). |
| DIGITAL CALIBRATION | Dead load, Span and scale Parameters via keyboard commands. Calibration may be performed by application of weights or by the mV/V values of the load cell data sheets. |

ANALOG INPUT

| | |
|---|---|
| LOADCELL EXC/TION | +5V switched polarity or + 5 VDC with sense. |
| CONNECTION | 6 wire technique. Max 10 load cells 350 Ohm each. |
| SIGNAL RANGE | -0.25 to 2.0 mV/V (Gain=10), -0.25 to 4.0 mV/V (Gain=20). |
| SENSITIVITY | min 0,4 µV / digit (VSI) approved scales.<br>min 0,1 µV / digit non-approved scales. |
| INPUT AMPLIFIER | Input noise 0.3µVp-p. Input bias current 10nA typical. |
| A/D CONVERTER | Sigma delta 550.000 internal counts max.<br>Conversion speed 3, 7, 14, 28, 57, 70 Hz (selectable). |
| LINEARITY | Within 0,002% of full scale. |
| SPAN TEMP-COEFF | $\leq$ 2 ppm / $^{o}$C. |
| ZERO TEMP-COEFF | $\leq$ 2 ppm / $^{o}$C. |
| LONG TERM STABILITY | 0.005 % of full scale per year. |

| | |
|---|---|
| 2nd ANALOG INPUT (OPTIONAL) | Two inputs for the connection of analog load cells.<br>Technical specifications of 2nd analog input are the same of the primary analog input.<br>Each input has its own configuration and calibration parameters. |
| DIGITAL INPUT (x1) | 9-24 VDC ± 20 %, positive common optoisolated to 2.5 kV.<br>Input resistance 3.3 KΩ.<br>ON delay 2 ms max. OFF delay 2 ms max. |
| DIGITAL OUTPUT (x2) | 24 VDC ± 10 % transistor (SOURCE) darlington, positive common.<br>Max current 100 mA - leakage current 100 µA.<br>Max off - state voltage 30 VDC.<br>ON delay 2 ms max - OFF delay 2 ms max.<br>All outputs optoisolated to 2.5 KV. |

**ANALOGUE OUTPUT**

| | |
|---|---|
| CURRENT or VOLTAGE | Hardware selectable via jumper JP1 or printed circuit board 761 |
| CURRENT OUTPUT | 0 - 20 mA or 4 - 20 mA.<br>Max load resistance 1KΩ (line + termination). |
| VOLTAGE OUTPUT | 0.02 - 10 V. Min load resistance 1KΩ. |
| RESOLUTION | Internal 16 bit.<br>External 16 bit or in accordance with regulation. |
| LINEARITY | Better than 0,01% of FSR. |
| THERMAL STABILITY | 50 PPM/$^{0}$C typical. |

# 4 FRONT PANEL DESCRIPTION

## *4.1 WEIGHT AND OPERATOR DIALOGUE DISPLAY*

- When the indicator is in the STAND BY mode it displays the weight on the scale.
- To enter the menu press Menu while the terminal is in the standby mode. To select menu items use the arrow keys and press Menu or AE to activate the blinking item. To exit the menu or return to previous menu press Esc.
- During a weighing operation, process data, status and warnings or errors are dynamically displayed.
- When the scale is not in motion a dot is displayed next to the ▬◄ symbol.
- When scale weight is within 1/4 of scale division a dot is displayed next to the **->0<-** symbol.
- When scale is in the net weight mode a dot is displayed next to the **Net** symbol.
- If a 2nd analogue input is installed, characters "s1" , "s2" or "s0" appear at the right position of the LCD display , indicating scale 1 or scale 2 or SUM (scale 1 + scale 2) weights respectively (2 scales connected).

## *4.2 KEYBOARD DESCRIPTION*

⏻ **POWER ON-OFF**

- Turns the unit on and initiates power on self-test.
- Turns the unit off. It must be kept depressed for 3 sec.

→0← **MANUAL ZERO**

Resets the weight display to zero, provided that the scale is stable and the weight indicator is in gross weight display mode. Zeroing range is limited to ± 2% of scale capacity. The Zero value acquired with this key will be in effect until a new zeroing operation or power down.

→T← **MANUAL TARE**

Tares the scale. It operates if the indication is positive and stable. The indicated weight is stored in the
tare memory and the display is reset to zero. From then on the indication will show the difference between the weight on the scale and the weight stored in the tare memory (net).
When the key is depressed for a second time it clears the Tare Memory, cancels net weight display mode and returns to gross weight indication. The tare memory is lost in power down.

←T **TARE RECALL / MANUAL PRESET TARE**

It operates in the weight display mode only. In Net mode it displays the tare value in use for a brief period of time. In Gross mode it is used to enter a tare value directly from the keyboard.
The display shows P.TARE: 00000. Key in the desired tare and press "AE" to proceed or press "Esc" to abort. When "AE" is pressed the tare keyed in will be automatically in effect and the weight display will turn to Net mode. To be accepted the tare value must be within the weighing range. The pre-set tare will be lost in power down.

**PIECE COUNTING**

Toggles between weight mode or piece counting mode.

**PRINT WEIGHT**

Initiates printouts. In stand by mode the indicated weight and date time will be printed.

**SELECT SCALE**

- When the 2nd analogue input is installed the key switches between scale 1 or scale 2 or SUM (scale 1 + scale 2).
- The indicator may display the SUM of the two scales provided that the decimal point and display step of the two scales are the same.

**1st WEIGHING**

Initiates the 1st weighing dialogue.

**2nd WEIGHING**

Initiates the 2nd weighing dialogue.

Menu **ENTRY TO MENU**

When the terminal is in the weight display mode pressing this key will enter the menu mode. While in the menu the key may be used as "AE".

▲ **CURSOR UP / PREVIOUS RECORD**

▼ **CURSOR DOWN / NEXT RECORD**

When the terminal is in the STAND BY mode, keys ▲, ▼ are used for LCD backlight adjustment.

◄ **CURSOR LEFT / NEXT FIELD DOWN**

► **CURSOR RIGHT / NEXT FIELD UP**

Esc **ESCAPE / ABORT**

The key is used to exit from data input-output routines or to abort an operation.

CE **DELETE ENTRY**

Deletes / clears displayed data during data entry routines.
File data is not affected unless an "AE" is pressed after "CE".

**ACCEPT ENTRY**

Accepts displayed data and proceeds to next step when pressed during data entry and / or activates the blinking item in menu mode.

**0 - 9 NUMERIC KEYS**

To enter alphanumeric characters, press the key repeatedly until the desired character is selected. When key is not pressed the displayed character is entered and cursor moves to the next position.

## *4.3 MENU STRUCTURE*

System operator interface is based on a structured menu system, realized on the front panel display.
Access to menu system items may be subjected to password entry (if activated), in order to avoid accidental data changes. To select menu items use the ▲ or ▼ arrow keys and press Menu or AE to activate the displayed item. To enter the menu press Menu while in weight display mode.
To exit the menu press Esc. The contents of the menu system is listed below:

| | | |
|---|---|---|
| WEIGH | - PCS CNT | Piece count. |
| | - SETP | Setpoint inspect / modify. |
| | - COPY | Copy last weighing ticket. |
| | - ALIBI | (VIEW, PRINT, CSUM) Alibi memory. |
| VFILE | - PRINT | (TARE, FIRST, ALL, SELECT) submenu. |
| | - EDIT TARE | Edit tare weighing memory. |
| | - CSUM | File verification. |
| | - DEL | (TARE, FIRST, ALL, SELECT) submenu delete. |
| | - SIZE | File information of occupied and available records. |
| TFILE | -STOT | Subtotal of net weights. Press ◎ to print, CE to reset. |
| | -TOTAL | Total of net weights. Press ◎ to print, CE to reset. |
| MISC | - INFO | Indicator model and serial number. |
| | - 1OIML | Display Audit Trail Counter, W&M Seal status channel 1. |
| | - 2OIML | Display Audit Trail Counter, W&M Seal status channel 2. |
| | - BATTERY | Display remaining battery capacity (% of max capacity). |
| | - HIGH RES. | Increases the weight display resolution 10 times. |
| SYSTEM | - DATE | Edit date - time and serial print number ( User password protected). |
| | - PIN | (PIN SYS, PIN OPER) Software lock handling (Personal Identification Number). |
| | - PRP | Weighing process parameters inspect/ modify. |
| | - 1CAL | PAR, ZERO, SPAN, INIT, WRITE calibration menu for input 1. |
| | - 2CAL | PAR, ZERO, SPAN, INIT, WRITE calibration menu for input 2. |
| | - D/A CAL | 0-20mA,0-10V analogue output calibration. |
| | - SET | Operational setup submenus. |
| | - TEST | Hardware and software service aids. |

SYSTEM OPERATIONS MAY BE USER (PIN OPER) OR SERVICE (PIN SYS) PASSWORD PROTECTED. PASSWORDS ARE ACTIVATED FROM SYSTEM/ PIN MENU.
PAR & 1CAL,2CAL MENUS ARE HARDWARE PROTECTED BY CALIBRATION SEAL.
DELETE OPERATIONS ARE USER PASSWORD PROTECTED.

# 5 SYSTEM OPERATIONS

Calibration of the scale, hardware and software configuration and settings of the A/D converters is done Through the SYSTEM menu. To exit the menu or return to previous menu press Esc.

## *5.1 DATE-TIME-SERIAL PRINT NUMBER EDIT (DATE)*

This is performed in the SYSTEM \ DATE menu.
The display shows PASSWORD:..... in the SYSTEM menu if password is activated.
Key in the user or the service password to proceed. Select DATE submenu.
Key in the new date, time and print serial number.
If a field should not be changed then just press "AE" to go to the next field.
The default date format is Day - Month - Year. The time format is Hours: Minutes: Seconds.

## *5.2 PIN - PASSWORD PROTECTION SYSTEM (PIN)*

To safeguard against accidental system parameter alteration and/or operational data erasure, a two level password system has been implemented.
A system password (PIN SYS) that allows entry to all protected operations (SYSTEM submenu) and a user password that allows delete and date edit operations.
FT-03 units are shipped with both password not active i.e. 000000. Once initialied the password will be required before entry to protected operations is permitted.
To activate / change the passwords use the menu SYSTEM \ PIN. Select PIN SYS for the service password, or PIN OPER for the user password. The PIN SYS is of higher order and must be activated before the OPERATOR PIN.

PASSWORD CHANGE / INITIALISATION
The display shows NEW CODE : . Key in the new password followed by "AE".
The display shows CONFIRM : . Key in the same password followed by "AE".
The new pin is stored and the display shows PASS briefly.
If the two entries are not the same, FAIL is displayed briefly and the program returns with the old pin remaining in memory.

The password is saved and activated.

PASSWORD DEACTIVATION
Enter six zeroes to deactivate the password followed by "AE".
The display shows NEW CODE : _ . Press 000000 followed by "AE".
The display shows CONFIRM : _ . Press 000000 followed by "AE".

***WARNING:***
***Make sure you do not loose the code entered. If the code is lost the unit must be returned to the factory to initialise the passwords and a fee will be charged.***

## 5.3 PROCESS PARAMETERS (PRP)

These are operational and process parameters that allow configuration of the terminal in the working process environment. Press ▲ ▼ to scroll trough the parameters.

S.EMPTY : 5.0kg Enter the weight that may remain on the scale and still be considered empty.

## 5.4 SCALE CALIBRATION (1CAL, 2CAL)

From the system menu select 1CAL for scale 1 calibration or 2CAL for scale 2 calibration.
Scale calibration may be performed using weights or the mV/V values of the load cells.
ZERO and SPAN calibration maybe performed independently.

### 5.4.1 CALIBRATION SECURITY

To prevent unauthorised calibration a calibration lock "CAL LOCK" facility is provided, required by Weights & Measures Authorities so that calibration can be sealed. This is a jumper (JP1) placed inside the unit on the main board (PCB 801, Stainless steel enclosure) . With this jumper inserted the user may only change the SETUP. Scale calibration can not be accessed. FT-03 units are shipped with CAL LOCK jumper not inserted. For tabletop enclosures the CAL LOCK facility appears on pins 7,8 of Loadcell connector on the rear panel. If the pins are shorted the calibration is locked. In addition to the "CAL LOCK" jumper an A.T.CNT
(Audit Trail Counter) is provided for Weights & Measures Authorities to check if any calibration attempt has been made since the last inspection. The A.T.CNT (6 digits) is incremented when a weight parameter is changed, or a scale calibration is attempted, regardless if the changes are saved in EEPROM or not. The position of the "CAL LOCK" jumper and the A. T. CNT number may be inspected in the menu MISC \ 1OIML for scale connected to analog input 1 or 2OIML for the scale connected to analog input 2.
If the CAL LOCK is inserted the display will show SEALED.

### 5.4.2 CALIBRATION PROCEDURES

To calibrate the unit follow the instructions below.

- Power up the instrument and allow 10 min for warm up.
- Proceed with set up and calibration as described in the next pages.
- The normal sequence for the scale calibration should be:
  Set the scale parameters, calibrate Zero, calibrate Span, write to EEPROM.
- Continue with operational and process parameter set up if not yet completed.
- After storage of calibration data, insert the CAL LOCK jumper and seal the unit.
- The parts of the enclosure can be sealed be means of either a wire and lead seal or a self-adhesive label.
- The seal bears the mark of the manufacturer or the mark of the verification officer.
- The following rules apply to setup and calibration procedures:
  Use ▲ and ▼ arrow keys move to previous / next item of a dialogue.
  If the item is blinking, press ◄ or ► keys to select the required value.
  In case of 2 digit data with 1 digit blinking, key in the value using numeric keys.
  Use ▼ or ↵ to accept the new value (or the existing value) and proceed to the next item.
  If Esc is pressed without data modification the old value remains.

### *5.4.3 SCALE PARAMETERS (PAR)*

Defines the scale parameters listed below. The PAR dialogue, Dead load (zero) and span calibration maybe accessed only if the calibration lock jumper is not inserted.

| Nr | DESCRIPTION | POSSIBLE VALUES | NOTES |
|---|---|---|---|
| 0 | 2SCL ENABLE | YES/NO | YES: The operation of the 2nd scale input is activated. This selection appears only in the 1CAL submenu. NO : All data of 2CAL submenu are ignored. |
| 0 | S1+S2 ENABLE | YES/NO | YES: Display of the sum of two scales is enabled. The selection appears only in 2CAL submenu.(look at "note" on page 15) |
| 1 | DISP.DIGITS | 4,5,6 | Number of weight display digits. |
| 2 | DEC.POINT (Position of decimal point) | 0 - 5 | Between any decade of the display starting from the rightmost digit. |
| 3 | SCALE DIV. | 1, 2, 5, 10, 20, 50,100,200 | Display resolution. |
| 5 | WEIG. RANGE | 00 - 99 | 2 most significant digits of the scale capacity. |
| 6 | DIG. FILTER (Floating average filter) | 0 - 5 | $2^x$ samples are averaged. 0=Low, 3=Normal 5=High. |
| 7 | CONV. RATE | 3,7,14,28,57,70 | A/D conversions per second. |
| 8 | MOTION SAMPLES | 1 – 7 | Number of samples for no motion detection. 1=Low, 7=High |
| 9 | AUTO Z TRACK | YES / NO | Enables auto zero tracking. Max 0.5 display divisions per second. |
| 10 | INIT ZERO | YES / NO | If enabled it will set the instrument to Zero after power on. If outside zeroing range (±2%), Error 15 will be displayed. |
| 11 | DUAL FILTER | YES / NO | The digital filter increases automatically when the scale is not in motion. |
| 12 | A/D AUTO CON. | YES/NO | YES: A/D converter errors (due to excessive noise) will be cleared automatically, when the cause is no long present. NO: The unit will require operator intervention to correct an A/D converter error. |
| 13 | BATTERY | YES / NO | YES = Battery conversion enabled (for battery powered models). |
| 14 | LEAD Z BLANK | YES / NO | If enabled leading zeroes will be suppressed. |

| Nr | DESCRIPTION | POSSIBLE VALUES | NOTES |
|---|---|---|---|
| 15 | A/D GAIN | 10,20 | 10= 2mV/V max input signal.<br>20= 4mV/V max input signal. |
| 16 | AC EXC. | YES/NO | YES: Switching polarity excitation, at a rate defined by the conversion rate. Switching excitation results in more stable zero.<br>NO: DC excitation selected for the load cells. |
| 17 | ZERO RANGE | 2% / 10% | The zero range may be either 2% or 10% of the scale capacity. |
| 18 | DUAL MODE | INTERV / RANGE | INTERV: The lower display division will be selected at the defined interval value.<br>RANGE: The lower display division will be selected at zero weight. |
| 19 | DUAL RANGE | 00 -99 | The first two digits defining the range where the lower display division will be selected automatically (Max1). |
| 20 | PR. BELOW MIN | YES / NO | If YES is selected weights below min (20 scale divisions) will not be printed. |
| 21 | CAL MODE | WEIGHT, ELECTR | Scale calibration is performed by weight or by mV/V load cell data sheets. |

Press Esc to abandon the PAR dialogue.

***NOTE:***

**The display of sum of two scales is performed only if the conditions below are met:**
**S1+S2 ENABLE = YES (2CAL submenu), DEC. POINT and SCALE DIV. are the same for both scales and DUAL RANGE=00 .**

If the sum is higher than the scale capacity a higher display division will automatically be selected.
The sum of conversions per second (CONV. RATE) of the two scales must be less than 70, else the unit sets CONV. RATE =14 for each scale.

### *5.4.4 WEIGHT CALIBRATION (ZERO & SPAN)*

If scale parameter CAL MODE is set to WEIGHT the procedure is as follows:
The display shows : EMPTY SCALE .
Observe that the scale is unloaded, the weight indication is stable and press "AE".
The display shows : WAIT . . . . . until it averages 64 samples for the dead load measurement, after which the weight display is reset to Zero. Repeat the procedure if the zero is not accurate.
Press "AE" to return to ZERO. Select SPAN.
The display shows : WEIGHT: 12345.
Key in the available calibration weight and press "AE".
The display shows : LOAD SCALE .
Load the calibration weights on the scale, wait until the weight display is stable and press "AE".
The display shows : WAIT . . . . . until it averages 64 samples for the span coefficient calculation, after which the calibration weight entered should be displayed. Scale calibration is complete.
Repeat the procedure if the indicated weight is not equal to the calibration weight.
Observe that when the scale is unloaded the indication is zero. If not repeat the scale calibration.
Press "AE" to return to SPAN.
Calibration is complete but factors obtained not protected in case of mains failure. Proceed to WRITE menu for permanent storage of calibration data.

### *5.4.5 ELECTRONIC CALIBRATION (ZERO & SPAN)*

If scale parameter CAL MODE is set to ELECTR the procedure is as follows:
The display shows : DEAD LOAD: 00000. Key in the overall mV/V value corresponding to the empty scale weight, (calculated from the load cell data sheets), and press "AE".
The entered value is placed in the ZERO CALIBRATION memory after which the weight display is reset to Zero. Repeat the procedure if the zero is not accurate. Press "AE" to return to ZERO. Select SPAN.
The display shows : L/C OUT : 00000. Key in the overall mV/V value (calculated from the load cell data sheets), corresponding to a calibration weight equal to the max capacity of the scale and press "AE". The entered value is used to compute the span factor after which the weight on the scale is displayed.

**EXAMPLE**
Assume a scale of Max= 30/60kg , e=0.010/0.020kg , with 4 loadcells of rated capacity 50kg -2mV/V each and the dead load is 1.940kg.
Loadcell data:
L/C1 : 1.9793 mV/V output at 50kg and zero balance : 0.0257 mV/V.
L/C2 : 1.9392 mV/V output at 50kg and zero balance : 0.0276 mV/V.
L/C3 : 1.9577 mV/V output at 50kg and zero balance : 0.0553 mV/V.
L/C4 : 1.9640 mV/V output at 50kg and zero balance : -0.0022 mV/V.

LC RATED OUTPUT average = (1.9793 + 1.9392 + 1.9577 +1.9640) / 4 = 1.9600 mV/V
LC OUTPUT AT SCALE MAX = 1.9600*60 / 4*50 = **0.5880** mV/V
L/C ZERO BALANCE average = [0.0257 + 0.0276 + 0.0553 + (- 0.0022)] / 4 = 0.0266 mV/V
SCALE DEDLOAD : 1.9600 mV/V . $\frac{1.940 \text{ kg}}{(4x50\text{kg})}$ = 0.0190 mV/V
OVERALL DEADLOAD = L/C ZERO BALANCE + SCALE DEADLOAD = **0.0456** mV/V

Enter the value of **0.0456** for the zero calibration and **0.5880** for span calibration.

Calibration is complete but factors obtained not protected in case of mains failure. Proceed to WRITE menu for permanent storage of calibration data.

### *5.4.6 INIT*

Loads default scale parameters, calibration and configuration data to enable start up after manufacturing or service of the electronics printed circuit board.
The display shows "O.K. ? AE=Y , CE=N".
Press “AE” to load the default configuration / calibration or press “CE” key to exit without change.
INIT is not accessible if the calibration lock is inserted.
NOTE: Even if INIT is selected the init values will be lost in power down unless a WRITE operation was executed.

### *5.4.7 WRITE*

Stores calibration data and configuration parameters in EEPROM.
The display shows "O.K. ? AE=Y , CE=N".
Press “AE” to store new parameters in non volatile memory or press “CE” key to exit without change.
After storage the unit will restart.

## *5.5 ANALOGUE OUTPUT (D/A CAL)*

Used to set the analogue output parameters and calibrate the output if a calibration other than the standard is required.
The analogue output option is designed to interface the FT-03 unit to weighing automation systems.
It consists of a D/A converter (with voltage or current output) galvanically isolated. The output is capable of driving 20mA into 1KΩ load. The circuit may be operated as current output (0 - 20 mA, 4 - 20 mA, 0 - 24 mA) or voltage output (0-10V). The selection of the operating mode is done hardware by means of jumper JP1 on PCB 761 (Factory set to 0 - 20 mA mode) and parameter OUTPUT.
The output maybe operated with standard calibration where 0 on the weight display is output as 0 mA or 4 mA and max on the display is output as 20mA. Also user defined calibration is available where 0 on the display is output at the user defined value (Zero) and max on the display is output at the user defined value (FULL). User defined calibration also applies to the voltage output mode.

| | | | |
|---|---|---|---|
| 1 | CALIBRATION | SDT / USER | SDT =Standard (20mA on max).<br>USER =User defined Zero & Span. |
| 2 | SCALE ERROR | 0mA / 24mA | Select whether the analog output when there is a scale error will be 0 mA or 24Ma. |
| 3 | OUTPUT | CURR/VOLT | Current or voltage output. |
| 4 | MODE | NET/ GROSS | Net weight or Gross weight operation. |
| 5 | CURRENT | 0-20 / 4-20 | 0-20mA or 4-20mA. |
| 6 | RESOLUT. | DISP / INT | Display or internal resolution. |
| 7 | OPERATION | NO / YES | NO = disabled.<br>YES = enabled. |

Dialogue D/A CAL continues below only if CALIBRATION = USER.

Display shows ZERO D/A XX.XXX .
Key in the D/A output in mA or Volt (depending on configuration) to define the D/A output for zero weight indication and press AE.

or Press Esc to escape from D/A calibration.

Display shows FULL D/A XX.XXX .
Key in the D/A output in mA or Volt (depending on configuration) to define the D/A output for max weight indication and press AE.
The program ends after the definition of full.

To select current or voltage output the jumper JP1 on PCB 761 should be placed in the proper position

CONNECTION
Pin 1 = Current output (+).
Pin 2 = Voltage output (+).
Pin 3 = Common (current or voltage).
Pin 4 = power in (+).
Pin 5 = power in (-) .
Connect Pins 1 & 3 for current output.
Connect Pins 2 & 3 for voltage output.

**An external power supply 24VDC is required for the analog output operation.**

**ADJUSTMENT OF D/A VOLTAGE**

If adjustment of the output 0-10V is necessary:

1. Place jumper JP1 on PCB (761) for voltage output.
2. Power up the unit and enter D/A CAL menu to set parameters as follows:

| | | |
|---|---|---|
| CALIBRATION | = | USER |
| SCALE ERROR | = | 0mA |
| OUTPUT | = | VOLT |
| MODE | = | NET |
| CURRENT | = | 0-20 |
| RESOLUT. | = | INT |
| OPERATION | = | YES |

   Skip D/A calibration and save the SETUP with a WRITE operation.
3. Use D/A test from SYSTEM \ TEST submenu. Display shows 00000. Enter the value 65535.
4. Measure with a voltmeter the voltage at pins 2 (+) and 3 (-) on analogue output connector. Record the value.
5. Exit D/A test and re-enter D/A CAL menu to define Zero of D/A (value 00.000) and the Full value calculated as:

$$\text{Full} = \frac{100}{\text{measured voltage (in volts)}}$$

## 5.6 SYSTEM PARAMETERS SET UP (SET)

These are operational and process parameters that allow configuration of the terminal to perform the intended task in the working environment.

### 5.6.1 OPERATIONAL (OPER)

Operational set up dialogue for terminal configuration of the controller.

| | | | |
|---|---|---|---|
| 01 | TOTALIZING M | YES / NO | YES= Totaliser is activated.<br>NO= Disabled. |
| 02 | WEIGHING MEM | YES/NO | YES= 1st weighing data are stored in memory. NO= Disabled |
| 03 | REFR CODE | 0-4 | Number of reference codes (descriptions) for prompt and entry during 1st and 2nd weighing. 0 = Disables reference codes<br>NOTE: Only the 2 first codes are stored in weighing memory. |
| 04 | CODE MEM | YES /NO | YES= The last keyed in data will be remembered upon reference code entry. |
| 05 | WAIT UNLOAD | YES /NO | YES= After printout the indicator inhibits further operation until the scale is unloaded so that the same weight is not printed twice.<br>NO= Scale unload check is disabled. |
| 06 | 1stW PRINT | YES /NO | YES = The first weighing will be printed and stored in memory.<br>NO = The first weighing will be stored in memory and operator will be prompted to release the ticket printout. |
| 07 | USER FORMS | YES / NO | YES = Custom ticket forms andreference prompts may be programmed by the service personnel.<br>NO = The default forms and references programmed by the factory are used. |
| 08 | KEY IN TIME | 00– 99 | Time in 0.1 sec for cyclic character selection entry. 00=Disables alpha characters. |
| 09 | BRIGHTNESS | LOW/MID1/MID2/HIGH | LCD backlight brightness default adjustment. |
| 10 | DATE FORMA | D-M-Y / M-D-Y | Date format. Day-Month-Year or Month -Day –Year. |
| 11 | AUTO PWR OFF | 00-99 | Auto power off time in minutes.<br>00=disable auto power off function. |

### *5.6.2 SERIAL PORTS (1COM,2COM)*

Serial port configuration / printer setup submenu. Used to select baudrates, data bits of the serial ports and to assign data output of each port. Tickets and continuous weight output may be assigned to more than one port at the same time. Listing(s) output may have one destination only (serial port 1).

Use ◄ , ► keys to select and ▲ , ▼ keys to scroll through the items.

Press Esc to abandon the dialogue at any moment.

**1COM Serial port 1 (RS232C, 2400 Baud fixed)**

| | | |
|---|---|---|
| PARITY/DATA | : | E7,N8 E7=Even parity 7 data bits, N8=No parity 8data bits |
| OPERATION | : | NONE, TICK3, WOUT, ALIBI. |
| PRN TYPE | : | EP-FX =(EPSON-FX), TM-295. |
| ERROR CTRL | : | YES = Printer error (DTR) detected will be displayed and acted upon.<br>NO = Errors will be ignored. |
| | Note: | Error control should be NO for communication with a PC. |

**2 COM Serial port 2 (RS485)**

| | | |
|---|---|---|
| BAUDRATE : | 2400-57600 | |
| PARITY/ DATA: | E7,N8,E8 | E= Even parity selected, N = No parity, 7or 8=data bits. |
| OPERATION : | **M/SA** | Master/Slave operation. Address of slave is A to Y (41h to 59h).<br>Refer to LESIP for details. |
| | ERROR CTRL | YES = Errors detected will be displayed and acted upon.<br>NO = Errors will be ignored. |
| | RETRY | YES = The operator is prompted to retry transmission.<br>NO = The preset number of retransmissions will be executed after which the communication is aborted. |
| | DIS. PROTO | YES = The operator is allowed to disable further communication in case of repeated errors.<br>NO = The operator may not disable the communication. |
| | X-MIT RESULT | YES = Individual weighings will be transmitted to host.<br>NO = Only the start and stop reports are transmitted. |
| | KBD COM/DS | YES = Keyboard commands may be issued by the host.<br>NO = Keyboard commands from the host are not accepted. |
| | **NONE** | Port is disabled. |
| | **W.OUT** | Continuous weight transmission. |
| | **R.PRN** | Remote printer operation, no handshake. |

| | |
|---|---|
| **EDP** | Transmission of weighing protocol to Host computer. |
| ERROR CTRL | YES = Errors detected will be displayed and acted upon.<br>NO = Errors will be ignored. |
| PROTO A / N | YES = ACK / NAK handshake is active.<br>NO = No handshake. |
| DIS. PROTO | YES = The operator is allowed to disable protocol operation in case of repeated errors.<br>NO = The operator may not disable the protocol. |
| HOST ENQ. | YES = Waits for the reception of ENQ character before it begins transmission.<br>NO = Transmits without check for ENQ. The host should always be ready to receive. |

Press Esc to abandon the dialogue at any moment.

### *5.6.3 INIT*

The file configuration may be initialised, (load default table in EPROM), in the SYSTEM \ SET \ INIT menu. Be aware that this is a system initialisation in which all user defined data will be replaced by factory programmed data in order to bring the controller to a defined state.

### *5.6.4 TICKET FORMATS (FORM)*

Used to view / edit print formats used for ticket printout. Default formats (factory programmed in FT-03 memory) may be used or custom tickets may be edited by the user (with an ASCII editor) and downloaded to the unit via serial port 1.
The print formats consist of data strings with scale variables, inserted in the string at specified positions when the format is transmitted.

Four weighing ticket formats are available.
1st weighing = Ticket Nr 01
2nd weighing = Ticket Nr 02
Key ⊙ = Ticket Nr 03
Piece count = Ticket Nr 04

When a print operation takes place FT-03 will insert the print fields in selected positions in the string specified with [!123], where 123 is the decimal code of the variable. E.g. scale variable 17 (net weight) should be inserted as [!017]. Non printable characters may be inserted in the string specified as [@123], where 123 is the decimal equivalent of the character code. E.g. Esc E (1Bh, 45h) is inserted as [@027]E.
This may be repeated as many times as required in the string. A print ticket may contain max. 1023 bytes.

**SCALE VARIABLES**

| Fields | Description | Fields | Description | Fields | Description |
|---|---|---|---|---|---|
| [!001] | INDICATOR ADDRESS (A-Y) | [!016] | SERIAL NUMBER | [!031] | 2nd WEIGHT |
| [!002] | | [!017] | NET WEIGHT | [!032] | CODE 0 PROMPT |
| [!003] | SCALE 1ST WEIGHING (S1) | [!018] | | [!033] | CODE 0 DATA |
| [!004] | SCALE 2nd WEIGHING (S2) | [!019] | ALIBI DATA (S/N+ weight) | [!034] | CODE 1 PROMPT |
| [!005] | DATE DATA | [!020] | | [!035] | CODE 1 DATA |
| [!006] | | [!021] | MF or MT or M@ | [!036] | CODE 2 PROMPT |
| [!007] | | [!022] | NET WEIGHT (1W-2W) | [!037] | CODE 2 DATA |
| [!008] | | [!023] | SER. No 1st WEIGHING | [!038] | CODE 3 PROMPT |
| [!009] | | [!024] | DATE 1st WEIGHING | [!039] | CODE 3 DATA |
| [!010] | | [!025] | TIME 1st WEIGHING | [!040] | CODE 4 PROMPT |
| [!011] | APW average piece weight | [!026] | 1st WEIGHT | [!041] | CODE 4 DATA |
| [!012] | No of PIECES | [!027] | SER. No 2nd WEIGHING | [!042] | TOTAL |
| [!013] | TIME DATA +sec | [!028] | DATE 2nd WEIGHING | [!043] | SUBTOTAL |
| [!014] | GROSS WEIGHT | [!029] | TIME 2nd WEIGHING | [!044] | |
| [!015] | TARE WEIGHT | [!030] | TIME 2nd WEIGHING+ sec | [!045] | |

#### 5.6.4.1 DOWNLOAD FORMAT(S)

Formats may be downloaded from the host computer (PC) and stored in the indicator's memory, or they may be uploaded to the host computer for replication or storage.
Setup requirements SYSTEM \ SET \ OPER \ USERFORMS = YES.
Connect the PC to serial port 1 (RS232C) of FT-03. Use a serial communication program (e.g. Hyper terminal, Procomm) and set serial port, baud rate/data bits. Select DOWNLOAD FORM \ DOWNLOAD submenu and press key "AE".
Display shows " TICKET Nr : 00" . Enter the desired ticket number.
Display shows "TRANSMIT….." and the indicator uploads the current ticket 01 to the PC.
The format may be used to edit a new and then downloaded.
Display shows "READY? AE=Y , CE=N ". Press "AE" . The indicator turns to receive mode and the message "RECEIVE…" is displayed. Download the ticket to the indicator and press "ESC" to acknowledge the end of transmission. The message "END OF FORM" appears briefly and the received ASCII block is transmitted to the PC for verification.
The received ticket is stored in non volatile memory. A max of 1023 bytes may be stored. If more characters are received they will be lost.

#### 5.6.4.2 DEFAULT TICKET FORMATS (DEFAULT)

Selecting "DEFAULT" loads default formats to initialise the controller to known formats.
The display shows: "O.K. ? AE=Y , CE=N".
Press "AE" key to load factory set formats stored in EPROM or "CE" to abandon default loading.

### *5.6.5 REFERENCE CODES (REFR)*

Used to view , edit the code 0 to 4 prompts for weighing reference entries.
- Select EDIT to view or change the description. Display shows "CODE 0:VEHICLE".

Key in the desired description (max 10 characters) and press AE. The description is stored.
Display shows the next code. Continue in the same way.
- Select DEFAULT to load factory set formats from EPROM.

The display shows "O.K. ? AE=Y , CE=N".
Press "AE" to store default text or press "CE" key to exit without change.

### *5.6.6 TILT SWITCH (TILT)*

Used to set the time delay for the tilt switch function.
The display shows "TILT DELAY : xx". If xx=00 tilt function is disabled. Else set the time delay (time in 1/10 sec) for display lock. Display locks after xx time when contacts close and unlocks after the same time, when contacts open. Refer to cabling diagram in Annex A for connection.

TECHNICAL CHARACTERISTICS OF INPUT
9-24 VDC, positive common optoisolated to 2,5 KV.
Input resistance 3,3 KΩ.
ON delay 2 msec max. OFF delay 2msec max.

### *5.6.7 SETPOINTS (SETP)*

The SET POINT option is designed for interfacing FT-03 units with weighing automation systems.
It contains two opto-isolated outputs that can be operated as weight set points. Refer to cabling diagram in Annex A for connection.
The display shows “SETP GROSS= NO”. Select “NO” for activation by net weight or “YES” for activation by gross weight value.
The display shows “SETP NC= NO”. Select “NO” for normally open operation or “YES” for normally closed operation.
Programming of setpoints is selected via the WEIGH \ SETP submenu.
Display shows SETP 1: XXXXXX the existing setpoint value. Key in the desired value and press “AE”.
Display shows SETP 2: XXXXXX the existing setpoint value. Key in the desired value and press “AE”.
Program returns to main menu. The setpoints are saved in EEPROM.

### *5.6.8 TEST UTILITIES (TEST)*

Contains software utilities to assist service personnel in pinpointing hardware / software failures.
The tests may be activated from the SYSTEM \ TEST submenu. A short description of the available functions follows below. It is assumed however that service personnel are familiar with microprocessor controlled weighing electronics.
If password is activated, PIN SYS is required to enter the test menu.
Use the ▲ ▼ arrow keys to select the test item and press AE.

A / D : Displays the analog to digital converter internal counts. Press Esc to exit.

CVM : The actual mV/V output of the scale sensors is displayed. To act as a mV/V meter the unit loads default calibration data. The decimal point is not displayed.
Axxxxx corresponds to scale 1, Bxxxxx to scale 2 . Press Esc to end. The unit restarts.

D/A : Key in a value from 0-65535 corresponding to 0-24mA or 0-10V. Press Esc to end.

I / O: The display shows (INP:0 OUT:00) the state of the system inputs or outputs represented by 0 or 1. Press 1 or 2 to toggle outputs 1 or 2 respectively. Press Esc to exit.

KBD: Display blanks. When a key is pressed the corresponding two digit – code appears on 2 rightmost digits of display. Press Esc to exit.

LCD: Displays the character set in sequence.

MEM: Memory test submenu.
A validity check is performed on system ROM and RAM.
Err 01 will be displayed if ROM data is corrupted.
Err 02 will be displayed if RAM data is corrupted.
If all memory is OK the display returns to MEM mode.

PORT: Any character received by COM 1 will be echoed and displayed in ASCII HEX at Rx1--.
Any character received by COM 2 will be echoed and displayed in ASCII HEX at Rx2--.
**Note:**
Set ERROR CTRL=NO at SYSTEM \ SET \ 1COM submenu to perform this test with a PC.

# 6 COMMUNICATION PORTS

The instrument is equipped with two communication channels, for connection to serial peripheral devices such as printers, remote displays, host computers.

## *6.1 SERIAL COMMUNICATION PORT 1. (RS232C)*

| | |
|---|---|
| TYPE | Asynchronous serial ASCII, full duplex. |
| PROTOCOL | 2400 baud, 1 start, 7 data/even parity or 8 data/no parity (set up selectable), 1 stop bit. |
| HANDSHAKE | DTR BUSY per character for fanfold printers or REQUEST PAPER END STATUS for EPSON TM-295 slip printer. |
| CONNECTION | DB9 male on rear panel. (J1).<br>Tx = Pin 3<br>Rx/DTR = Pin 2<br>GND = Pin 5<br>SHIELD = Metal case of D-Type connector<br>Cable: 3 conductor shielded max distance 15m. |
| OPERATION | Software operation and printer interface of serial port 1 is selectable in SYSTEM \ SET \ 1COM, and maybe one of the following modes: |

- TICK 3. Printer mode.
  Prints the 1st weighing, 2nd weighing and simple weighing protocols.
  The printer driver and error control maybe selected in
  SYSTEM \ SET \ 1COM \ PRN TYPE and maybe one of EP-FX
  (Epson Fx mode) or TM-295 (Epson TM295 slip printer).
- W.OUT. Continuous weight output mode. The weight is being transmitted continuously.
  The data format is defined in § 6.2.1.
- ALIBI. Demand mode .
  When a demand character is received the unit saves the weight in its Alibi flash and then transmits the Alibi number and the weight.
  i.e. 1234 _ 012340kg G CR LF
  The demand character may be programmed in
  SYSTEM \ SET \ 2COM \ M/S (A-Y) where A (41h) will generate and transmit a new Alibi number and a(61h) will repeat the last Alibi number (in case the message was not received properly).
- NONE. The port is inactive.

## 6.2 SERIAL COMMUNICATIONS PORT 2 (RS485)

| | |
|---|---|
| TYPE | Asynchronous serial ASCII, half duplex. |
| PROTOCOL | 2400 to 57600 baud, 1 start, 7 or 8 data, 1 Even parity, 1 stop bit. |
| CONNECTION | DB9 female on rear panel. (J3). |
| | A = Pin 6 |
| | B = Pin 7 |
| | SHIELD = Metal case of D-Type connector |
| | A termination resistor 120R may be connected by shorting pins 8 and 9. |
| | Cable: 2 conductor twisted pair and shielded max distance 1000m. |

OPERATION Software operation of the port is selectable in SYSTEM \ SET \ 2COM menu.

- W.OUT. (continuous weight output ).
- M/S A. MASTER / SLAVE protocol (A = network address).
- EDP. Protocol output.
- R. PRN. Remote printer.

### 6.2.1 WEIGHT OUTPUT

A data block is output continuously from Tx terminals containing weight and status information.
The output may be programmed in SYSTEM \ SET\ 1COM or 2COM to be directed to any of serial ports 1 or 2. It is possible to output simultaneously to both ports.

**DATA BLOCK COMPOSITION**
**STATUS, POLARITY, WEIGHT, SYNC (P+123.45CR)**

| BYTE | NAME | DESCRIPTION |
|---|---|---|
| 1 | WEIGHT STATUS | Bit0 0=NORMAL 1=NO WEIGHT DISPLAY<br>Bit1 0=GROSS 1=NET<br>Bit2 0= 1=AUTO ZERO<br>Bit3 0=WITHIN RANGE 1=OUT OF RANGE<br>Bit4 0=NO STANDSTILL 1=STANDSTILL<br>Bit5 0=NORMAL 1=UNDER MIN. WEIGHING RANGE<br>Bit6 ALWAYS 1 TO OBTAIN PRINTABLE CHARACTERS<br>Bit7 ZERO OR PARITY |
| 2 | POLARITY | "+" OR "-" |
| 3-8 | WEIGHT DIGITS | 6 DIGITS DEPENDING ON FIT-01 SET UP<br>INCLUDING DECIMAL POINT IF ANY |
| 9 | SYNC | CR (0d hex) FOR SYNCHRONISATION |

In the A**LIBI MODE** of operation the following serial commands have been added:

1. Transmit displayed weight. This is executed when ASCII character ? (3F hex) is received. The output data block is as shown above:

2. Command ZERO. Equivalent to pressing the front panel ZERO-Key. This is executed when ASCII character 0 (30 hex) is received. No data is returned to the host. Execution of the command may be verified by examining the weight (command ?).

**CONTINUOS WEIGH OUTPUT WITH DUAL SCALE (D.OUT)**

The output may be programmed in SYSTEM\SET\1COM or 2COM to be directed to any of serial ports 1 or 2.
The weight of each scale is being transmitted continuously in the form P+123.45 P+678.90CR where
P+123.45 is the weight of the first scale
P+678.90 is the weight of the second scale.
The data format of each scale is defined above.

### *6.2.2 REMOTE PRINTER MODE (R. PRN)*

Transmits the data printed on the local printer to a remote printer. No handshake is required.

### *6.2.3 EDP PROTOCOL OUTPUT (EDP)*

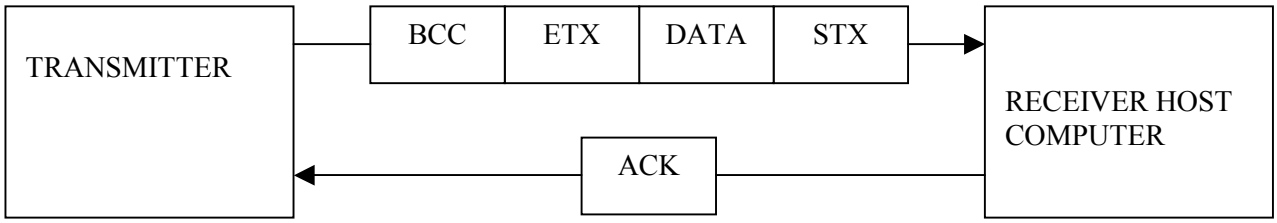
This mode is used to transmit the data printed to a host computer. Transmission will begin after completion of
printing. ACK / NAK handshake or no handshake may be used.
The host must reply with ACK (06 h) if it received the data correctly or NAK (15 h) to enable retransmissions.

| | | | |
|---|---|---|---|
| DATA BLOCK COMPOSITION | : | STX | = (02 h) = start of text character |
| | | DATA | = Printable ASCII data identical to the data printed. |
| | | ETX | = (03 h) = End of text character. |
| | | BCC | = Block check character.(XORSUM of all data characters STX, ETX inclusive) |
| HANDSHAKE | : | ENQ (05 h) from host within 5 sec of protocol initialisation. | |
| | | ACK (06 h) from host within 5 sec after the end of transmission. | |
| | or | NAK (15 h) from host within 5 sec after the end of transmission to enable retransmissions of the block. The number of repeats is unlimited. | |
| ERRORS | : | Err 30 | : Host not ready |
| | | Err 33 | : Host not Acknowledge |

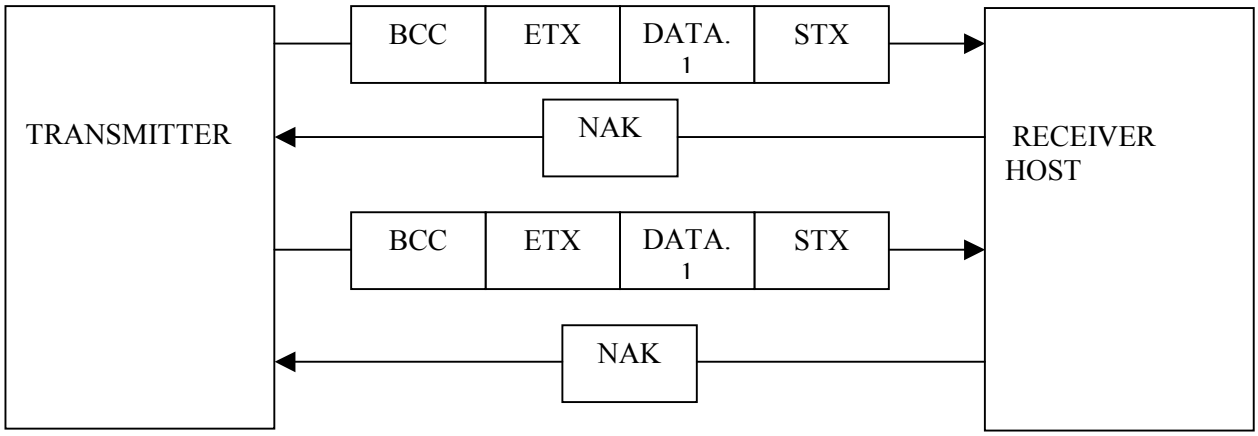
*Refer to Error chapter for details on error response.*

| | | | |
|---|---|---|---|
| SETUP REQUIREMENTS | : | 2COM = EDP | |
| | | ERROR CTRL | No / Yes |
| | | PROTO A/N | No / Yes |
| | | DIS. PROTO | No / Yes |
| | | HOST ENQ. | No / Yes |

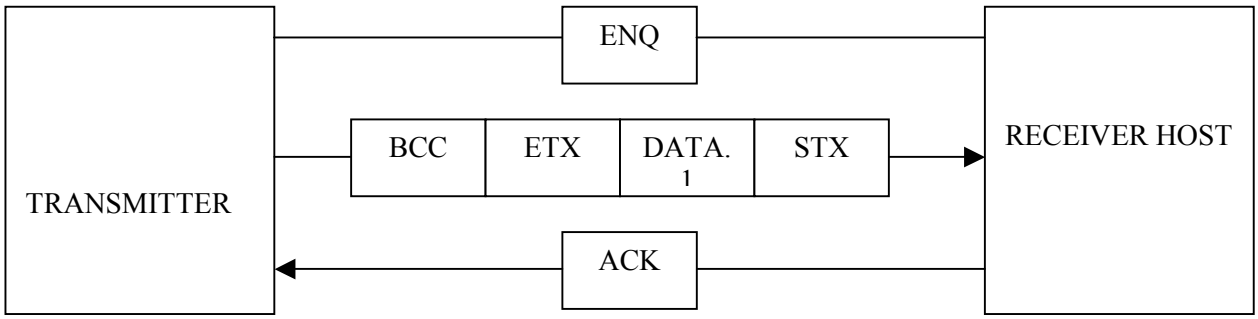
| | | |
|---|---|---|
| ERROR CTRL | : | The FT-03 checks the on line status of the interface and reports an error if failure is detected. |
| PROTO A/N | : | The FT-03 will check for reception of ACK / NAK character after transmission. |
| DIS. PROTO | : | The operator will be prompted to disable further transmission(s) if an error occurs, if DIS. PROTO = YES. Transmission will be enabled again after a power on reset.<br>If DIS. PROTO = NO only the current transmission will be aborted. |
| HOST ENQ. | : | The FT-03 waits for ENQ (05h) character before it begins transmission. |




**EXAMPLE : CORRECT TRANSMISSION TO HOST**




**EXAMPLE : REPEATED TRANSMISSION TO HOST**




**EXAMPLE : CORRECT TRANSMISSION TO HOST WITH ENQUIRY CONTROL**

### *6.2.4 MASTER / SLAVE NETWORK*

A number of FT-03 units maybe connected as slaves in a network. The master controlling the network maybe a Personal computer with RS485 adapter.
In this manner all units may have access to weighing data in the Master's memory or storage device.
When connected in network the following modes of operation maybe selected according to setup,
SYSTEM \ SET \ 2COM.

| SET UP PARAMETER | SLAVE | SLAVE WITH LOCAL WEIGHING MEMORY | SLAVE WITH REMOTE WEIGHING MEMORY | SLAVE WITH LOCAL &REMOTE WEIGHING MEMORY |
|---|---|---|---|---|
| TYPE / SLAVE ADDRESS | (65-89) A - Y | (65-89) A - Y | (65-89) A – Y | (65-89) A - Y |
| ERROR CTRL | YES/NO | YES/NO | YES/NO | YES/NO |
| RETRY | YES/NO | YES/NO | YES | YES/NO |
| DIS. PROTO | YES/NO | YES/NO | YES | YES/NO |
| X/MIT RESULT | YES/NO | YES/NO | YES/NO | YES/NO |

REFER TO **LESIP** FOR DETAILS
OF HARDWARE CONNECTION, FILE TYPES AND NETWORK OPERATION.

SLAVE Returns status and weighing results.

Address of slave (A - Y) for MASTER / SLAVE protocol.
Error control on communication sessions.
Operator response to communication errors (Retry or Abort).
ACK / NAK handshake is mandatory during file transfer except for keyboard commands.

**Setup parameters not mentioned above should be set to NO.**

# 7 ERRORS

If an error occurs during operation, it will be displayed in the form Err xx, where xx is the Error code followed by a brief mnemonic.

Press Esc or CE momentarily to acknowledge the error and proceed as indicated in the error operator response.

Errors may occur during set up, programming, power up and during operation. All errors are being displayed until acknowledged. In case of critical errors operation is halted and all outputs disabled.

The errors are subdivided as follows :

## *7.1 ERRORS DUE TO HARDWARE*

| ERROR DISPLAY | POSSIBLE CAUSE | ACTION TO BE TAKEN |
|---|---|---|
| E01: ROM | SYSTEM ROM : Faulty ROM chip | Contact service. |
| E02: RAM | DATA RAM : Faulty FLASH RAM | Contact service. |
| E04: EEPROM | CALIBRATION DATA : Faulty EEPROM | Contact service. |
| E05: SC-A/D s1<br>s2 | SCALE EXTREMELY OUT OF RANGE | Check scale, cable, connectors, LC excitation, A/D converter. Contact service. |
| E06: LOW VOLT. | LOW INPUT VOLTAGE | Check power supplied to the instrument. |

## *7.2 OPERATIONAL DATA ERRORS*

| ERROR DISPLAY | POSSIBLE CAUSE | ACTION TO BE TAKEN |
|---|---|---|
| E15: PWRUP ZERO | System has been initialized due to power failure or soft reset. | Zero scale. |
| E16: W DATE TIME | Not initialized or backup battery failure. | Enter new date – time, replace battery. |

## *7.3 PRINTER - PROTOCOL ERRORS*

| ERROR DISPLAY | POSSIBLE CAUSE | ACTION TO BE TAKEN |
|---|---|---|
| E20 :PRN NOT RDY | PRINTER IS NOT ON-LINE. Either not connected or out of paper or failed. | Check printer, cables. |
| E26:NO PAPER | No paper for EPSON TM295 printer. | Supply with paper. |
| E30:HOST NOT RDY | HOST NOT ON-LINE. Computer not connected or communication link failed. | Check computer, cables. Retry. |
| E33:HOST NOT ACK | Host not Acknowledge. No correct response has been received from host computer . | The same action as with E30. |

## *7.4 WEIGHING-PIECE COUNT-ALIBI MEMORY ERRORS*

| ERROR DISPLAY | POSSIBLE CAUSE | ACTION TO BE TAKEN |
|---|---|---|
| E40:OUT OF MEM. W | Weighing memory full. | Delete unused records or CSUM vehicle file. |
| E41:INVALID I.D. | No entry of data during 1st weighing. | Enter 1st weighing data. |
| E42:V/CLE IN W.F. | A first weighing has already been made for this vehicle. | Retry entry or carry out a 2nd weighing or delete the 1st weighing from memory. |
| E43:SCALE TARED | 1st or 2nd weighing can not be performed if the scale has been tarred. | GROSS must be activated. |
| E44:NEG. WEIGHT | Negative weights can not be printed. | Retry or abort. |
| E45:SCALE MOT. | Non stable weights can not be processed. | Wait until no motion indication is on, retry. |
| E47:OUT OF LIMIT | Weight is out of limits. | Retry. |
| E50:SAMPLE CNT | Small sample count. | Retry. |
| E51:SAMPLE WEIGH | Small sample weight. | Retry. |
| E55:ALIBI FULL | Alibi memory full. | Acknowledge the error. The unique identification number will reset to 0000. |
| E56:NO ALIBI | No Alibi memory in NET mode (only gross). | Printout aborted. |
| E57:ALIBI CSUM | Alibi memory corrupted. | The Alibi memory can not be cleared but next records will be corrected. |
| E67:TM CHECKSUM | Corrupted totaliser. | Clear totalising memory. (TFIlE submenu) |
| E69:TM OVERFLOW | TOTALISER OVERFLOW. Because totalisers have not been cleared for long time. | Print / clear totaliser. Overflow is not critical, but remember that 1 total capacity must be added to the indication, each time an overflow occurs. |
| E77:WM CHECKSUM | Corrupted weighing memory. | Use DELETE menu in the VFILE to clear weighing memory. |

*To exit from error display press* Esc or CE.

# 8 OPERATIONS

This section contains information on operating procedures for the FT-03 Controller. First weighing, second weighing, batch weigh, and piece count procedures are described in the User manual.

## COPY WEIGHING TICKET

Selected via the WEIGH \ COPY submenu.
A reprint of the previous ticket is produced if no other action has taken place in the meantime.

## ALIBI MEMORY

The purpose of the Alibi memory is to produce an accurate non modifiable record of each weight transmission to a host computer so that the weight may be printed via the computer.
Alibi operation is selected via the WEIGH \ ALIBI submenu and contains 3 options :

VIEW
The display shows SERIAL NUM: 1 2 3 4 where 1234 is the serial number of the last record.
Key in the 4 digit serial number desired and press AE .The display shows the weight of this record (N:1234 12.3456kg). Only gross weights are stored. .Press ▲ ▼ to view previous / next memory locations.
Press ◎ to print the serial number displayed plus the next nine locations.

PRINT
Automatically prints a list of the contents of the Alibi memory. The printer must be capable of printing on 80 columns paper compressed mode.
Empty locations are printed - - - - - - .
Corrupted locations are printed * * * * * * .
The program exits when the printout is completed or Esc pressed.

CSUM
A checksum is performed on each Alibi memory record. If an error is found “E57:ALIBI CSUM” is displayed.
Press Esc to exit. If all is OK, PASS is displayed briefly.

## BATTERY

Selected via the WEIGH \ BATTERY submenu.
The battery charge will be displayed as a percentage of the remaining capacity.

# 9 MAINTENANCE

The unit does not require any routine maintenance. It may be necessary to perform periodic checks of the calibration of the scale due to mechanical reasons. The frequency of the calibration checks depends on the application condition and on the required measuring accuracy. It may happen that, in exceptional conditions, the unit locks on a wrong memory location and it is not possible to restart because the keyboard is not operative. To restart is necessary to switch the power OFF then ON again.

## *9.1 SERVICE*

- There are no serviceable parts. The unit must be serviced by trained personnel only. The user may check load cell connection and power supply.

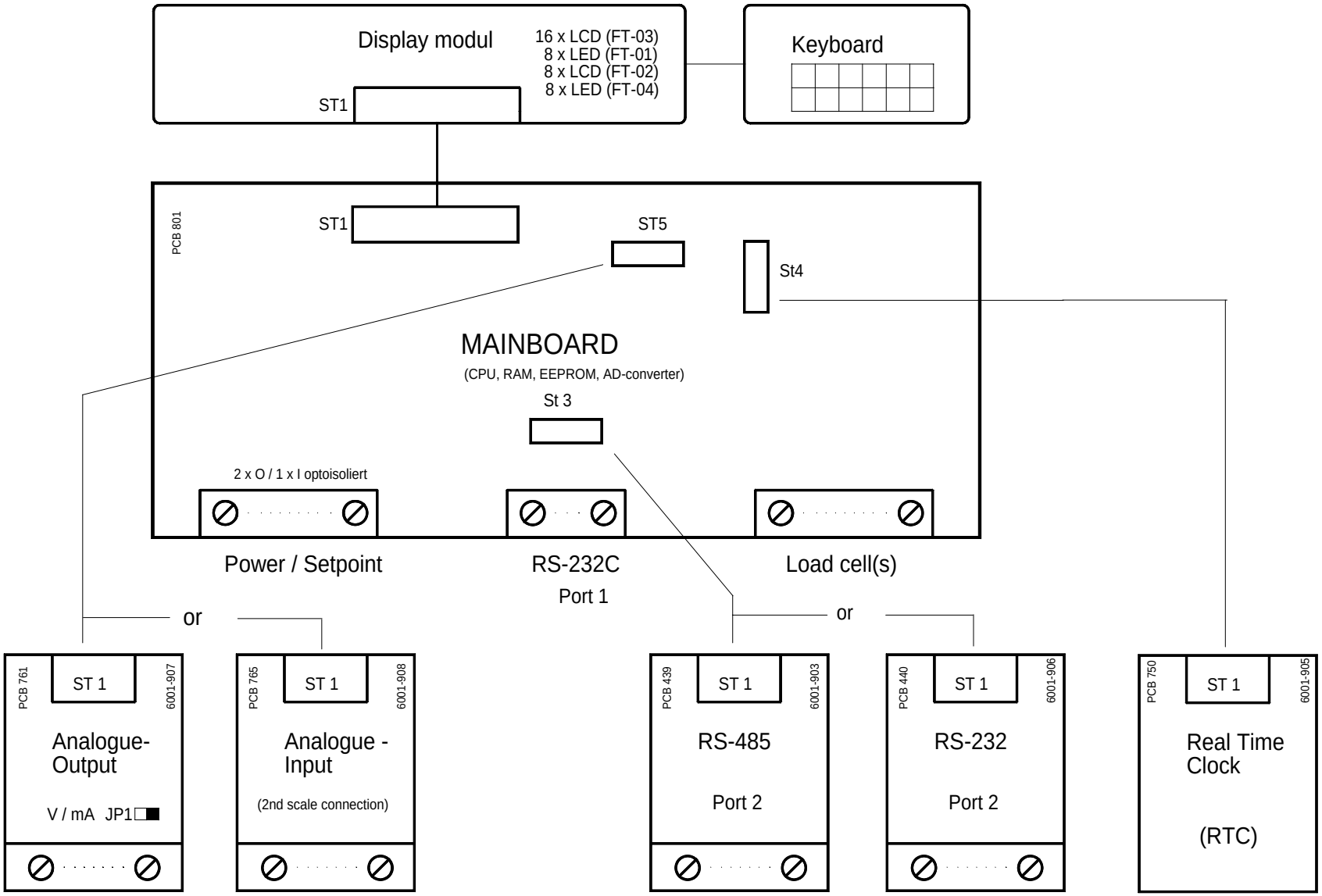
- LOAD CELLS
  Load cells are reliable and very rarely present errors. Check input and output resistance, and resistance between any terminal and shield. Check Load cell connection and cable.

- POWER SUPPLY
  Check power supply

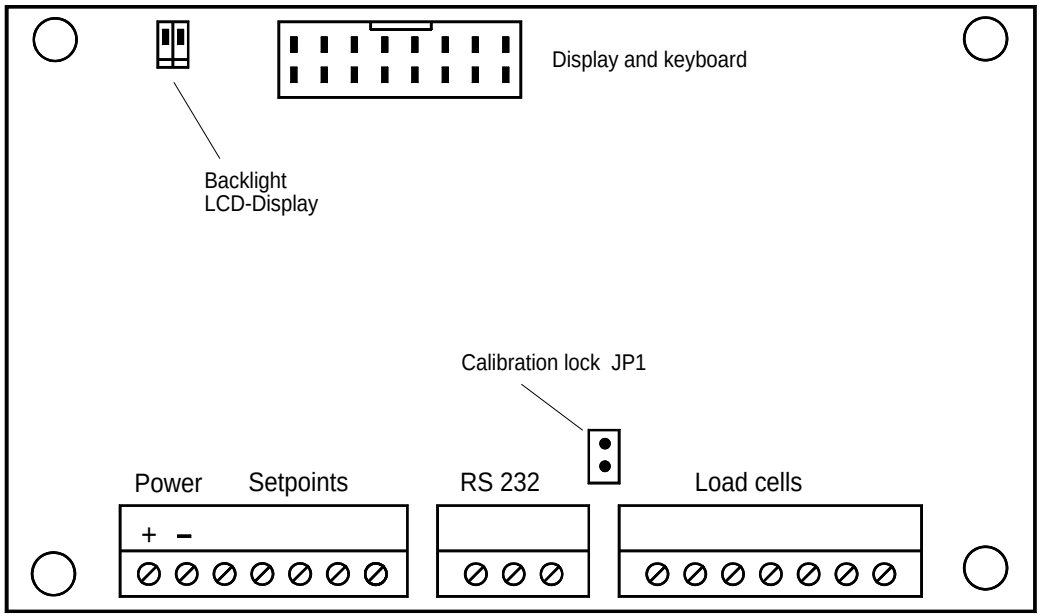
- SETPOINT OUTPUTS
  Check 24VDC power supply

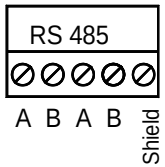
FLINTEC GmbH maintains a fully trained staff of field service engineers who provide:
- Technical assistance by telephone.
- Application assistance on-site or by telephone.
- Trouble shooting on-site.
- Warranty (replacement) or spare parts assistance.
- Training on-site or at out service centre.
- Equipment updates to our latest configuration.

Our engineers will check repair, mechanical, electrical, electronic, wiring and calibration errors.




| | | | |
|---|---|---|---|
| CONTRACT NO. | Flintec GmbH | | |
| CUSTOMER | | | |
| DRAWN BY Greulich | DWG NO. Block diagram FT-series and options | | |
| CHECKED BY | FILE | DATE 28.01.2002 | SHEET 1 of 1 |




| | | |
|---|---|---|
| 1 | + | Power |
| 2 | - | Power |
| 3 | + | Input |
| 4 | - | Power supply input |
| 5 | | Output 1 |
| 6 | | Output 2 |
| 7 | + | Power supply setpoints |

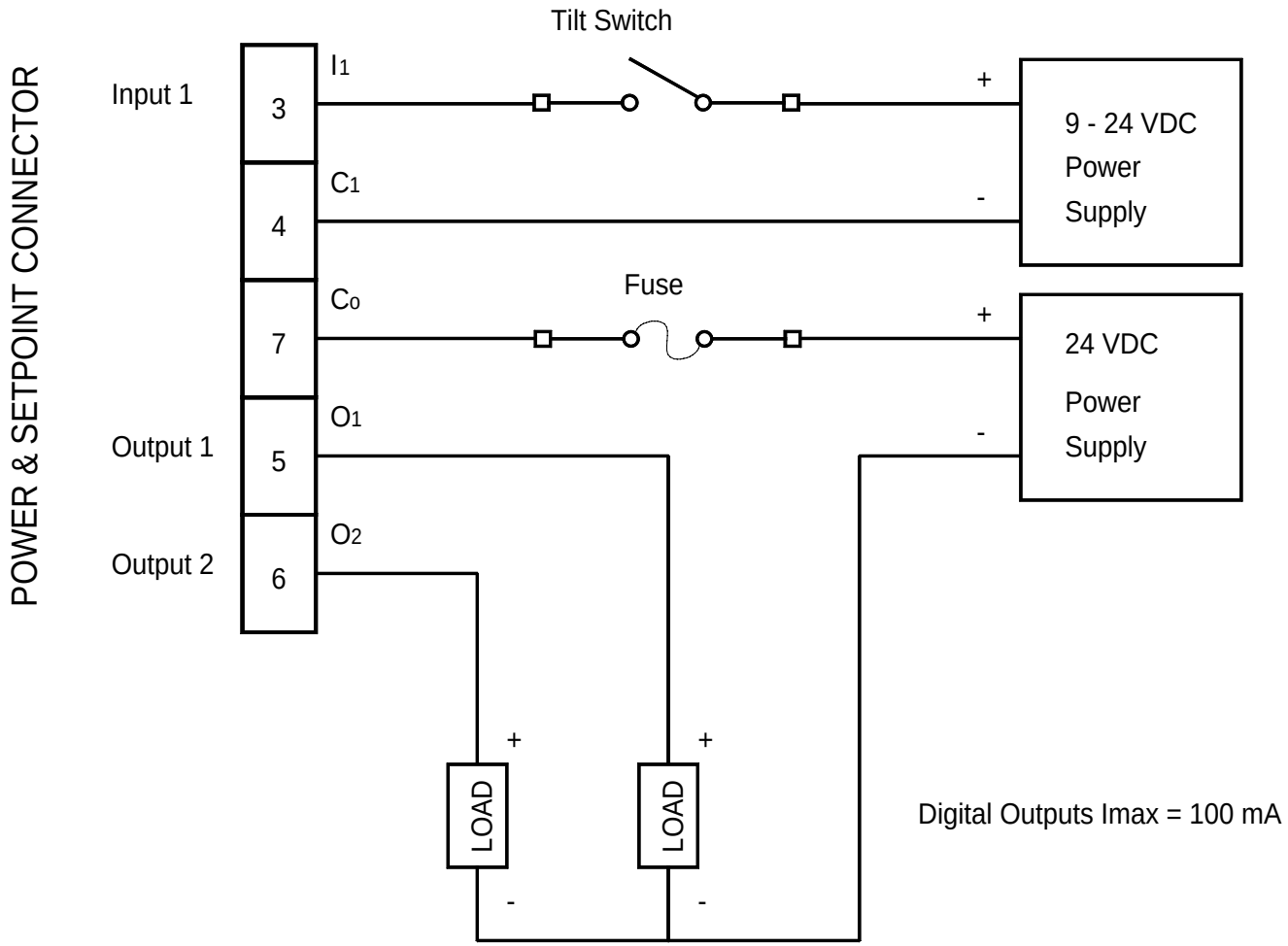
| | | |
|---|---|---|
| 7 | - | Excitation |
| 6 | - | Sense |
| 5 | + | Sense |
| 4 | + | Excitation |
| 3 | - | Signal |
| 2 | + | Signal |
| 1 | | Shield |

6 - wire - technique

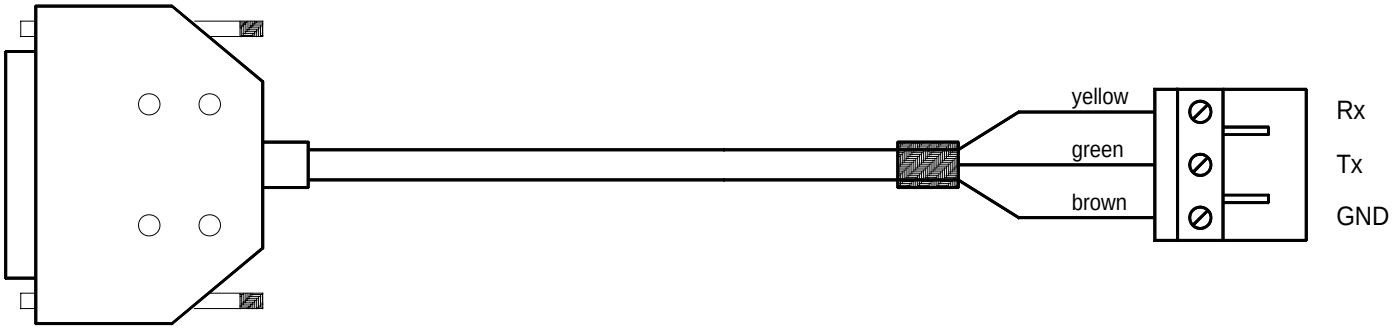
| | | |
|---|---|---|
| 7 | - | Excitation |
| 6 | - | |
| 5 | + | |
| 4 | + | Excitation |
| 3 | - | Signal |
| 2 | + | Signal |
| 1 | | Shield |

4 - wire - technique

| | | | |
|---|---|---|---|
| CONTRACT NO. | | Flintec GmbH | |
| CUSTOMER | | | |
| DRAWN BY Greulich | | DWG NO. Connectors FT-Serie | |
| CHECKED BY | FILE | DATE 28.01.2002 | SHEET 1 of 1 |

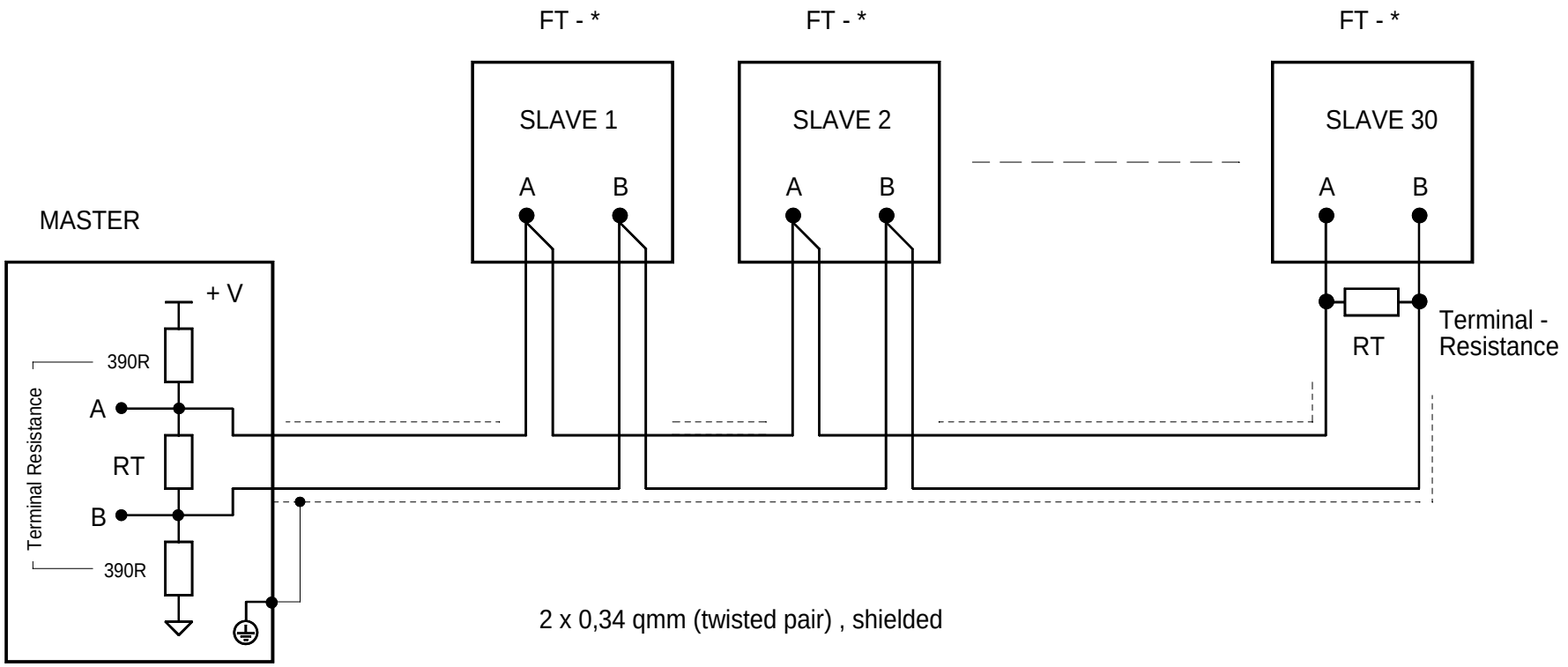



| | | | |
|---|---|---|---|
| CONTRACT NO. | Flintec GmbH | | |
| CUSTOMER | | | |
| DRAWN BY Greulich | DWG NO. Digital I / O FT-series | | |
| CHECKED BY | FILE | DATE 28.01.2002 | SHEET 1 of 1 |




| Epson PIN-No. | Colour | FT- COM1 RS-232 |
|---|---|---|
| 7 | brown | GND |
| 3 | green | Tx |
| 2 | yellow | Rx |
| Shield must be grounded ! | | |

| | | | |
|---|---|---|---|
| CONTRACT NO. | Flintec GmbH | | |
| CUSTOMER | | | |
| DRAWN BY Greulich | DWG NO. Printer cable RS232 (Epson) | | |
| CHECKED BY | FILE | DATE 15.07.2000 | SHEET 1 of 1 |

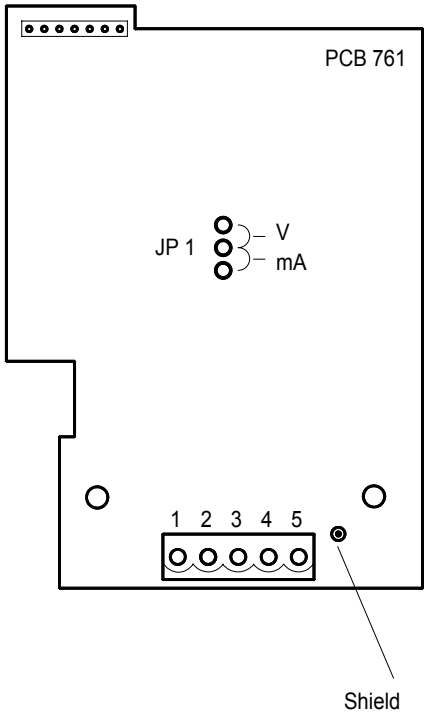



2 x 0,34 qmm (twisted pair) , shielded

Max. length 1000 m

# Cabling RS 485 Network

| | | | |
|---|---|---|---|
| CONTRACT NO. | Flintec GmbH | | |
| CUSTOMER | | | |
| DRAWN BY Greulich | DWG NO. RS485 Network FT-Series | | |
| CHECKED BY | FILE | DATE 28.01.2002 | SHEET 1 of 1 |




| | |
|---|---|
| 1 | + Current output |
| 2 | + Voltage output |
| 3 | I_out - or V_out - |
| 4 | + Power in (15 - 24 VDC) |
| 5 | - Power in |

| | | | |
|---|---|---|---|
| CONTRACT NO. | Flintec GmbH | | |
| CUSTOMER | | | |
| DRAWN BY Greulich | DWG NO. Option Analog output | | |
| CHECKED BY | FILE | DATE 15.07.2000 | SHEET 1 of 1 |

# ADDITION No. DK 0199.37/1
to
# CERTIFICATE
of
# EU TYPE-APPROVAL
# No. DK 0199.37
of
## FT-01 / FT-02 / FT-03 / FT-04 / FAD-1 / FAD-4 / FDT-A/B

**NON-AUTOMATIC WEIGHING INSTRUMENT**

**Issued by** **DELTA Danish Electronics, Light & Acoustics**
EU - Notified Body No. 0199

In accordance with the requirements of the non-automatic weighing instruments regulation No. 560 of 23 June 1992 which implements, in Denmark, Council Directive 90/384/EEC.

**Issued to** **Flintec GmbH**
Bemannsbruch 9
74909 Meckesheim
Germany

**In respect of** Non-automatic weighing instrument designated
**FT-01 / FT-02 / FT-03 / FT-04** / FAD-1 / FAD-4 / FDT-A/B
with variants of modules.
Accuracy class III
Maximum capacity, Max: From 1 kg up to 99,000 kg
Verification scale interval: e = Max / n
Maximum number of verification scale intervals: n = 10000
(however dependent on environment and the composition of the modules).
Variants of modules and conditions for the composition of the modules are set out in the ANNEX.

The conformity with the essential requirements in annex 1 of the Directive is met.

**Note: This addition is a revised edition, which replaces the certificate No. DK 0199.37.**

**The principal characteristics and approval conditions are set out in the descriptive ANNEX to this certificate.**

**The ANNEX comprises 30 pages.**

**Issued on** **2002-03-08**
**Valid until** **2011-07-11**

P. Bengtsen

**Signatory: P. Bengtsen**

*DELTA*
*Danish Electronics,*
*Light & Acoustics*

*Venlighedsvej 4*
*2970 Hørsholm*
*Denmark*

*Tel. (+45) 72 19 40 00*
*Fax (+45) 72 19 40 01*
*www.delta.dk*
*VAT DK 12275110*

Flintec GmbH
Bemannsbruch 9
D 74909 Meckesheim

**FLINTEC**

# Konformitätserklärung

*Declaration of conformity*

Déclaration de conformité

**Die nichtselbsttätige Waage**
*The non-automatic weighing instrument*
L'instrument de pesage à fonctionnement non automatique

**III**

| | |
|---|---|
| **Hersteller:**<br>*Manufacturer.*<br>Fabricant: | Flintec GmbH |
| **Typ/ Modell:**<br>*Type / Model:*<br>Type / modèle: | FT-01, -02, -03, -04,<br>FAD-1, FAD-4, FDT-A/B |
| **Nr. der EG-Bauartzulassung (gegebenenfalls):**<br>*No of the EC type-approval certificate (where applicable):*<br>N° du certificat d'approbation CE de type (le cas échéant): | DK 0199.37/1 |

**entspricht dem in der Bescheinigung über die Bauartzulassung beschriebenen Baumuster sowie den Anforderungen der EG-Richtlinie 90/384/EWG in der jeweils geltenden Fassung und den Anforderungen folgender Richtlinien:**
*corresponds to the production model described in the EC type-approval certificate and to the requirements of the Council Directive 901384lEEC as amended and to the requirements of the following EC directives:*
correspond au modèle décrit dans le certificat d'approbation CE de type, aux exigences de la directive 90/384/CEE modifiée et aux exigences des directives CE suivantes:

| | | |
|---|---|---|
| **89/336/EWG** | *891336lEE* | 89/336/CEE |
| **73/23/EWG** | *73123lEEC* | 73/23/CEE |

**entsprechend den folgenden Normen:**
*in conformity with the following standards:*
conforme aux normes suivantes:

EN 45501
EN 50081-1
EN 50082-1
EN 60950

Diese Erklärung gilt nur in Verbindung mit einer Konformitätsbescheinigung einer benannten Stelle.
*This declaration is only valid with a certificate of conformity by a notified body.*
Cette déclaration est valide seulement avec une attestation de conformité d'un organisme notifié.

**Unterschrift**
*Signature*
Signature

**Datum** **8. Februar1999**
*Date* *February 8, 1999*
Date 8ième février 1999

Gerhard K. Adam
Geschäftsführer
*General Manager*
Directeur

FLINTEC

# ADDITIONAL FEATURES

## Applicable to versions with software date 26.4.2002 or posterior

The following additional functionalities have been realized in the hardware and software the indicator.

**A. Power supply**

**B. COM1 also programmable at 9600 baud (transmission mode only)**

**C. New functionalities of digital input/outputs**

**D. Keyboard lock function**

**E. Batch weigh function**

**F. Alibi transmit – Alibi mode commands**

**G. Continuous weigh output with dual scale**

**H. Continuous weigh output with tare, net and gross information**

**I. Gross Tare Net weight transmission in Master/Slave mode**

**J. LESIP commands**

# A. POWER SUPPLY

FT indicators are now powered with 85- 265 VAC, via internal power supply board. The mains power cable is part of the standard scope of supply.
If a 9-15VDC power supply (external power source) is to be used, then it should be connected directly to the main PCB (801) In this case the internal power supply board (591) must be removed.

# B. COM1 PROGRAMMABLE AT 9600 BAUD

The port COM 1 can be programmed to work at 9600 bits/sec. This allows for connection of the FT to printers that support higher baudrates than 2400 bits/sec such as label printers. The port can be programmed via SYSTEM\SET\1COM\OPERATION\9600T.

NOTE: 9600 bits/sec is a Transmit Only capability. Reception of data in COM 1 is always at 2400 bits/sec.

# C. NEW FUNCTIONALITIES OF DIGITAL INPUT/OUTPUTS

## 1. DIGITAL INPUT (TILT SWITCH) PROGRAMMING

Used to program the time delay for the Tilt function or to select one of the extra functions.Setup through SYSTEM\SET\TILT. The display will show 'TILT INPUT: xx' where xx can take one of the following values:

- If xx=00 the digital input is disabled
- If xx=01 to 90 Tilt function and time delay is selected. Each unit represents a $1/10^{th}$ of a second delay for the display to lock (i.e xx=01 is $1/10^{th}$ sec delay, xx=02 is $2/10^{th}$ sec delay etc). The display locks xx time after the contacts have closed and unlocks after the same time, when the contacts have opened. Refer to cabling diagram Annex A for connections.
- If xx=91, Function Selected: Tare scale on the rising edge of the input (Setpoints always enabled)
- If xx=92, Function Selected: Print on the rising edge of the input (Setpoints always enabled)
- If xx=93, Function Selected: Setpoints are active when input is HIGH. Setpoints are inactive when input is LOW.
- If xx=94, Function Selected: Scale is tared at the rising edge of the input. If taring was successful, the setpoints are activated. Setpoints are inactive when input is LOW.
- If xx=95, Function Selected: When input is LOW, Scale 1 is selected and displayed. When input is HIGH, Scale 2 is selected and displayed.
- If xx=96 to 99, Tilt function enabled with time delay. This is the same as with xx being 01 to 90.

## 2. DIGITAL OUTPUTS PROGRAMMING

In addition to the normal setpoints programming via WEIGH\SETP menu, the FT 's two digital outputs can be programmed even further for use in weighing automation systems. Setup is through SYSTEM\SET\SETP.

The display will show "SETP 1.1 ON" and subsequently "SETP 1.2 ON", "SETP 2.3 ON" and "SETP 2.4 ON".

By adjusting them, the following functions can be selected:

- If SETP 1.1 ON=NO and SETP 1.2 ON=NO then OUTPUT 1=SetPoint 1
- If SETP 1.1 ON=YES and SETP 1.2 ON=NO then OUTPUT 1=No Motion
- If SETP 1.1 ON=NO and SETP 1.2 ON=YES then OUTPUT 1=Error
- If SETP 2.3 ON=NO and SETP 2.4 ON=NO then OUTPUT 2=SetPoint 2
- If SETP 2.3 ON=YES and SETP 2.4 ON=NO then OUTPUT 2=Zero
- If SETP 2.3 ON=NO and SETP 2.4 ON=YES then OUTPUT 2=Net

The display will then show:
"SETUP GROSS=NO". Select "NO" for activation by net weight or "YES" for activation by gross weight.

The display will then show:
"SETUP NC=NO". Select "NO" for normally open operation or "YES" for normally closed operation.
The above functions are available for Scale 1 only.

NOTE:

Setpoint programming is done via the WEIGH\SETP submenu.
Display shows SETP1:XXXXXX which is the existing setpoint value. Key in the desired value and press "AE" to enter.
Display shows SETP2:XXXXXX which is the existing setpoint value. Key in the desired value and press "AE" to enter.
Setpoints are saved in the EEPROM.

## D. KEYBOARD LOCK FUNCTION

Some of the function keys of the the FT 's keyboard can be locked to prevent unauthorized use. The key lock is setup through the SYSTEM\SET\LOCK KEY menu. Available keys to lock are the following:

- ZERO KEY
- TARE KEY
- P.TARE KEY (Preset tare key)
- PIECES KEY
- PRINT KEY
- SCALE KEY
- WEIGH1 KEY
- WEIGH2 KEY

To lock-unlock each of these keys toggle between LOCKD-UNLOC indication and press "AE" to select.

The key lock setup will be stored in the EEPROM after the selection has been completed and will remain there until a new setup has been selected.

## E. BATCH WEIGH FUNCTION

Utility for sequential weighing operations and printouts for products with the same references

Set up requirements: MENU \ WEIGH \ BATCH

**User instructions:**

- Key in already programmed references and proceed with the weigh operations
- Press ''Print Key'' to print a single line
- Press ''Escape'' to leave this menu

Example of a batch weigh ticket

CLIENT : ABC
PRODUCT : DEE
07-05-01 15:18:56 N:00084

| SN | WEIGHT | TOTAL |
|---|---|---|
| 0001 | 00.390kg | 000000.390kg |
| 0002 | 04.330kg | 000004.720kg |
| 0003 | 04.330kg | 000009.050kg |
| 0004 | 04.330kg | 000013.380kg |
| 0005 | 04.330kg | 000017.710kg |
| 0012 | 04.330kg | 000048.020kg |

## F. ALIBI TRANSMIT – ALIBI MODE COMMANDS

In the Alibi mode of operation the following serial commands have been added. This is applicable to serial port 1. Set through SYSTEM\SET\1COM\OPERATION\ALIBI

1. Transmit displayed weight. This is executed when ASCII character ? (3F hex) is received. The output data block is as shown below:

**DATA BLOCK COMPOSITION**
**STATUS, POLARITY, WEIGHT, SYNC (P+123.45CR)**

| BYTE | NAME | DESCRIPTION |
|---|---|---|
| 1 | WEIGHT STATUS | Bit0 0=NORMAL 1=NO WEIGHT DISPLAY<br>Bit1 0=GROSS 1=NET<br>Bit2 0= 1=AUTO ZERO<br>Bit3 0=WITHIN RANGE 1=OUT OF RANGE<br>Bit4 0=NO STANDSTILL 1=STANDSTILL<br>Bit5 0=NORMAL 1=UNDER MIN. WEIGHING RANGE<br>Bit6 ALWAYS 1 TO OBTAIN PRINTABLE CHARACTERS<br>Bit7 ZERO OR PARITY |
| 2 | POLARITY | "+" OR "-" |
| 3-8 | WEIGHT DIGITS | 6 DIGITS DEPENDING ON FT SETUP<br>INCLUDING DECIMAL POINT IF ANY |
| 9 | SYNC | CR (0d hex) FOR SYNCHRONISATION |

2. Command “ZERO” . Equivalent to pressing the front panel Zero key.
This is executed when ASCII character 0 (30 hex) is received.
No data is returned to the host. Execution of the command may be verified by examining the weight (command ?).

## G. CONTINUOUS WEIGHT OUTPUT WITH DUAL SCALE (W2OUT)

The output may be programmed in SYSTEM\SET\1COM or 2COM\W2OUT to be directed to any of serial ports 1 or 2.

The weight of each scale is being transmitted continuously in the form P+123.45 P+678.90CR
where P+123.45 is the weight of first scale
P+678.90 is the weight of second scale

The data format of each scale is defined below:

**DATA BLOCK COMPOSITION**
**STATUS, POLARITY, WEIGHT, SYNC (P+123.45CR)**

| BYTE | NAME | DESCRIPTION | | |
|---|---|---|---|---|
| 1 | WEIGHT STATUS | Bit0 | 0=NORMAL | 1=NO WEIGHT DISPLAY |
| | | Bit1 | 0=GROSS | 1=NET |
| | | Bit2 | 0= | 1=AUTO ZERO |
| | | Bit3 | 0=WITHIN RANGE | 1=OUT OF RANGE |
| | | Bit4 | 0=NO STANDSTILL | 1=STANDSTILL |
| | | Bit5 | 0=NORMAL | 1=UNDER MIN. WEIGHING RANGE |
| | | Bit6 | ALWAYS 1 TO OBTAIN PRINTABLE CHARACTERS | |
| | | Bit7 | ZERO OR PARITY | |
| 2 | POLARITY | "+" OR "-" | | |
| 3-8 | WEIGHT DIGITS | 6 DIGITS DEPENDING ON LD5204-06 SETUP INCLUDING DECIMAL POINT IF ANY | | |
| 9 | SYNC | CR (0d hex) FOR SYNCHRONISATION | | |

## H. CONTINUOUS WEIGHT OUTPUT WITH TARE, NET AND GROSS INFORMATION (A.OUT)

The output may be programmed in SYSTEM\SET\2COM\OPERATION\A.OUT to be directed to serial port 2. The weight indication of each scale is transmitted continuously along with its current TARE and GROSS weight. The form is:

P+123.45N0010.00T133.45G

Where the characters indicate: N for Net weight (The weight of the current scale being displayed)
T for the Tare weight
G for the Gross weight

The data format is defined below:

**DATA BLOCK COMPOSITION**
**STATUS, POLARITY, WEIGHT, N,TARA,T,GROSS WEIGHT,G,SYNC**
**(P+123.45N010.00T133.45GCR)**

| BYTE | NAME | DESCRIPTION |
|---|---|---|
| 1 | WEIGHT STATUS | Bit0 0=NORMAL 1=NO WEIGHT DISPLAY<br>Bit1 0=GROSS 1=NET<br>Bit2 0= 1=AUTO ZERO<br>Bit3 0=WITHIN RANGE 1=OUT OF RANGE<br>Bit4 0=NO STANDSTILL 1=STANDSTILL<br>Bit5 0=NORMAL 1=UNDER MIN. WEIGHING RANGE<br>Bit6 ALWAYS 1 TO OBTAIN PRINTABLE CHARACTERS<br>Bit7 ZERO OR PARITY |
| 2 | POLARITY | "+" OR "-" |
| 3-8 | INDICATED WEIGHT | 6 DIGITS DEPENDING ON FT SETUP INCLUDING DECIMAL POINT IF ANY OF THE PRIMARY DISPLAY |
| 9 | "N" | N STANDS FOR NET WEIGHT. IT WILL BE EQUAL TO THE GROSS WEIGHT WHEN THE TARE VALUE IS ZERO. |
| 10-15 | TARE | 6 DIGITS DEPENDING ON FT SETUP INCLUDING DECIMAL POINT IF ANY |
| 16 | "T" | T STANDS FOR TARE |
| 17-22 | GROSS WEIGHT | 6 DIGITS DEPENDING ON FT SETUP INCLUDING DECIMAL POINT IF ANY. THE GROSS WEIGHT. |
| 23 | "G" | G STANDS FOR GROSS WEIGHT |
| 24 | SYNC | CR (0d hex) FOR SYNCHRONISATION |

NOTE: When the display indication is not weight, the data string send to COM2 will be either
|A| |CR|
That is 'A' character followed by blank spaces and the 'CR' as a synchronization character
OR

|A| Error X |CR|
That is 'A' character followed by the word 'Error' and the Error Code (X) followed by 'CR' in case of an error.

# I. GROSS TARE NET WEIGHT TRANSMISSION IN M/S - MODE

In the Master/Slave mode of operation the following serial command has been added.

1. Transmit displayed Weight with Tare and Gross information for the current operational scale. This is executed when ASCII character ' =' (3D hex) is received. LESIP protocol is utilised. For detailed information of LESIP please refer to LESIP technical specifications. The command must be send to FT serial port COM2.

The output LESIP data format is shown below:

**|STX|Addr|=|0|Data Block|BCS2|BCS1|ETX**

The output data block is as shown below:

**DATA BLOCK COMPOSITION**
**STATUS, POLARITY, WEIGHT, N,TARA,T,GROSS WEIGHT,G,SCALE NUMBER**
**(P+123.45N0100.00T233.45GSN)**

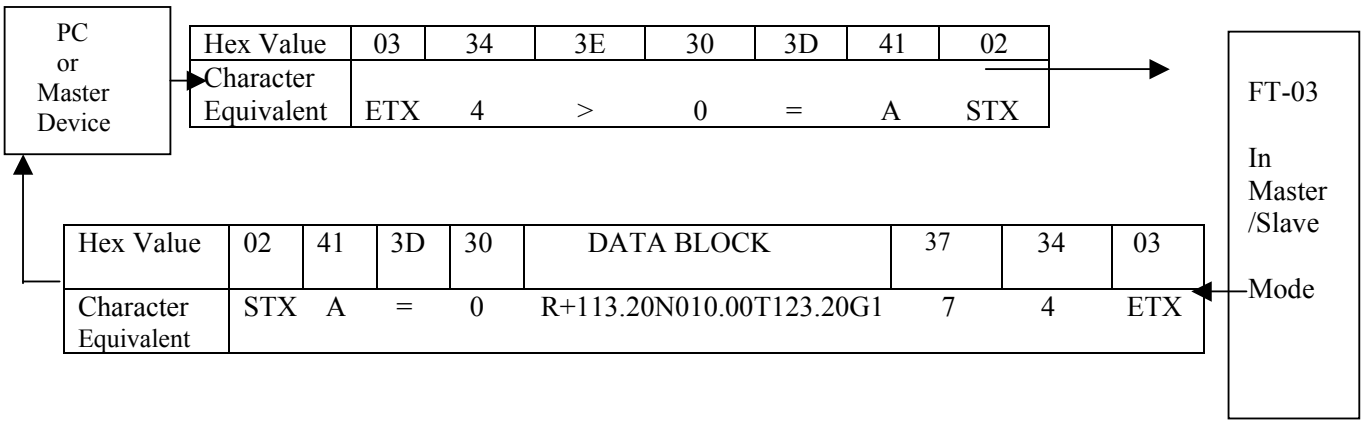
| BYTE | NAME | DESCRIPTION |
|---|---|---|
| 1 | WEIGHT STATUS | Bit0 0=NORMAL 1=NO WEIGHT DISPLAY<br>Bit1 0=GROSS 1=NET<br>Bit2 0= 1=AUTO ZERO<br>Bit3 0=WITHIN RANGE 1=OUT OF RANGE<br>Bit4 0=NO STANDSTILL 1=STANDSTILL<br>Bit5 0=NORMAL 1=UNDER MIN. WEIGHING RANGE<br>Bit6 ALWAYS 1 TO OBTAIN PRINTABLE CHARACTERS<br>Bit7 ZERO OR PARITY |
| 2 | POLARITY | "+" OR "-" |
| 3-8 | INDICATED WEIGHT | 6 DIGITS DEPENDING ON FT SETUP INCLUDING DECIMAL POINT IF ANY OF THE PRIMARY DISPLAY |
| 9 | "N" | N STANDS FOR NET WEIGHT. IT WILL BE EQUAL TO THE GROSS WEIGHT WHEN THE TARE VALUE IS ZERO. |
| 10-15 | TARE | 6 DIGITS DEPENDING ON FT SETUP INCLUDING DECIMAL POINT IF ANY |
| 16 | "T" | T STANDS FOR TARE |
| 17-22 | GROSS WEIGHT | 6 DIGITS DEPENDING ON FT SETUP INCLUDING DECIMAL POINT IF ANY. THE GROSS WEIGHT. |
| 23 | "G" | G STANDS FOR GROSS WEIGHT |
| 24 | "SN" | SN STANDS FOR SCALE NUMBER |

Setup Requirements:
Set through SYSTEM\SET\2COM\OPERATION\M/S

**Sample execution:**

Suppose the primary display indicates 123.20kg and the Tare value is 10.00kg.
The address of Slave is “A”.

MASTER TRANSMITION




SLAVE RESPONSE

## J. LESIP COMMANDS

**LIST OF FILE TYPES (COMMANDS)**

| COMMAND | HEX | DESCRIPTION | TIME | SLAVE RESPONSE |
|---|---|---|---|---|
| ? | 3F | UPLOAD WEIGHT & STATUS | 50 ms | STATUS + WEIGHT |
| @ | 40 | RESET SLAVE | 15ms | NONE |
| K | 4B | DOWNLOAD KEY | 0.1 ms | NONE |

### ? UPLOAD STATUS

It is the main command used to poll the SLAVE(s), which reply with the current weight being measured or with a message if bit0 of status byte is '1'. In the normal state the SLAVE will respond within 3-4 character time.
(e.g. with 9600baud, the character time ≈ 1 msec, the master should expect reception of STX from the SLAVE within 5 msec after the ETX was transmitted from the master).

*Master transmission*

| STX | ADD | ? | 0 | BCS2 | BCS1 | ETX |
|---|---|---|---|---|---|---|

*Slave response*

| STX | ADD | ? | 0 | STATUS BYTE | WEIGHT | X | Y | Z | BCS2 | BCS1 | ETX |
|---|---|---|---|---|---|---|---|---|---|---|---|

WEIGHT = 5 digits + decimal point if any.(ASCII,MSD FIRST)

X = Scale number : 0 = Scale 1 + Scale 2
1 = Scale 1
2 = Scale 2

Y = Digital input (TILT) 0 = Not Active
1 = Active

Z = Setpoints 0 = Neither is active
1 = Setpoint 1 is active
2 = Setpoint 2 is active
3 = Setpoint 1, Setpoint 2 are active

STATUS BYTE

| b7 | b6 | b5 | b4 | b3 | b2 | b1 | b0 |
|---|---|---|---|---|---|---|---|
| Zero or Parity | 1 | Under Min. Weighing Range 0=NO, 1=YES | No Motion 0=NO, 1=YES | Out of Range 0=NO 1=YES | Autozero 0=NO 1=YES | 0=Gross 1=Net | 0=Normal Weight 1=No Weight |

*The **s**lave response will contain a message in place of the weight if b0 of the status byte is high.*

**@ . RESET SLAVE**

Resets the slave to its power on condition.

*Master transmission*

| STX | ADD | @ | 0 | BCS2 | BCS1 | ETX |
|---|---|---|---|---|---|---|

*Slave response*
None.

**K. DOWNLOAD KEY**

It is used to download keyboard commands. Remote keyboard commands BIT must be enabled.

*Master transmission*

| STX | ADD | K | 0 | xx | BCS2 | BCS1 | ETX |
|---|---|---|---|---|---|---|---|

*Slave response*
None.

Where xx for FT-03

| | |
|---|---|
| 00 = Keyzero | 27 = Keymenu |
| 01 = Keytare | 30 = Key0 |
| 02 = Keytarerecall | 31 = Key1 |
| 05 = Keydown | 32 = Key2 |
| 06 = Keyprint | 33 = Key3 |
| 08 = Keyleft | 34 = Key4 |
| 09 = Keyup | 35 = Key5 |
| 11 = Keyright | 36 = Key6 |
| 17 = Key1weighing | 37 = Key7 |
| 18 = Key2weighing | 38 = Key8 |
| 19 = Keyscale1 2 | 39 = Key9 |
| 22 = Keyesc | 92 = Keydel |
| 26 = Keypieces | 93 = Keyenter |

# NEW INSTRUCTIONS AND MODES

## Software Version 7/10/2002

1. In Continuous mode there is discrimination between TARE and PRESET TARE. Where TARE will be printed with a ‘T character at the end, PRESET TARE will be printed with a ‘P’ character at the end.

2. The user can transmit the required TARE via a PC with the use of the LESIP protocol.

3. Separation of COM1 and COM2 addresses when COM1 is in Alibi mode.

4. This version of FT-03 now features a Bootloader program, resident to the microprocessor that allows the device to be programmed with new software versions as they are produced.

Each of the new functions is described in detail in the following paragraphs

# 1. TARE-PRESET TARE IN CONTINIOUS AND M/S MODES

## A. CONTINUOUS WEIGHT OUTPUT WITH TARE AND GROSS INFORMATION (A.OUT)

The output may be programmed in SYSTEM\SET\2COM\OPERATION\A.OUT to be directed to serial port 2. The weight indication of each scale is transmitted continuously along with its current TARE and GROSS weight. The form is:

P+123.45N010.00(T/P)133.45G

Where the characters indicate:

**N** for Net weight (The weight of the current scale being displayed)
**G** for the Gross weight

**T** for the Tare weight when the scale was manually tared OR
**P** for the Tare weight when the tare was preset either from the device or from a PC.

The data format is defined below:

**DATA BLOCK COMPOSITION**
**STATUS, POLARITY, WEIGHT, N,TARE,T or P,GROSS WEIGHT,G,SYNC**
**(P+123.45N010.00(T/P)133.45GCR)**

| BYTE | NAME | DESCRIPTION |
|---|---|---|
| 1 | WEIGHT STATUS | Bit0 0=NORMAL 1=NO WEIGHT DISPLAY<br>Bit1 0=GROSS 1=NET<br>Bit2 0= 1=AUTO ZERO |
| 1 | | Bit3 0=WITHIN RANGE 1=OUT OF RANGE<br>Bit4 0=NO STANDSTILL 1=STANDSTILL<br>Bit5 0=NORMAL 1=UNDER MIN. WEIGHING RANGE<br>Bit6 ALWAYS 1 TO OBTAIN PRINTABLE CHARACTERS<br>Bit7 ZERO OR PARITY |
| 2 | POLARITY | "+" OR "-" |
| 3-8 | INDICATED WEIGHT | 6 DIGITS DEPENDING ON FT-03 SETUP INCLUDING DECIMAL POINT IF ANY OF THE PRIMARY DISPLAY |
| 9 | "N" | N STANDS FOR NET WEIGHT. IT WILL BE EQUAL TO THE GROSS WEIGHT WHEN THE TARE VALUE IS ZERO. |
| 10-15 | TARE | 6 DIGITS DEPENDING ON FT-03 SETUP INCLUDING DECIMAL POINT IF ANY |
| 16 | "T"/"P" | 'T' STANDS FOR TARE WHEN THE SCALE WAS MANUALLY TARED AND 'P' FOR PRESET TARE WHEN THE SCALE HAS A PRESETED |
| 17-22 | GROSS WEIGHT | TARE<br>6 DIGITS DEPENDING ON FT-03 SETUP INCLUDING |
| 23 | "G" | DECIMAL POINT IF ANY. THE GROSS WEIGHT. |
| 24 | SYNC | G STANDS FOR GROSS WEIGHT<br>CR (0d hex) FOR SYNCHRONISATION |

NOTE: When the display indication is not weight, the data string send to COM2 will be either

|A|  |TARE VALUE|T or P|GROSS VALUE|G|CR|

That is ‘A’ character followed by blank spaces and the ‘CR’ as a synchronization character

OR

|A| Error X |TARE VALUE|T or P|GROSS VALUE|G|CR|

That is ‘A’ character followed by the word ‘Error’ and the Error Code (X) followed by ‘CR’ in case of an error.

The only difference of the A.OUT mode in this software version compared to the standard version (26/4/2002) is that TARE and PRESET TARE are discriminated in the continuous output by a ’T’ or a ‘P’ character, respectively, next to the actually tare value.

## B. GROSS-TARE-NET WEIGHT TRANSMISION IN THE MASTER/SLAVE MODE

In the Master/Slave mode the following change has been made to the '=' command:

The output LESIP data format is shown below:

**|STX|Addr|=|0|Data Block|BCS2|BCS1|ETX**

The output data block is as shown below:

**DATA BLOCK COMPOSITION**
**STATUS, POLARITY, WEIGHT, N,TARE,T or P,GROSS WEIGHT,G,SCALE NUMBER**
**(P+123.45N100.00(T/P)233.45GSN)**

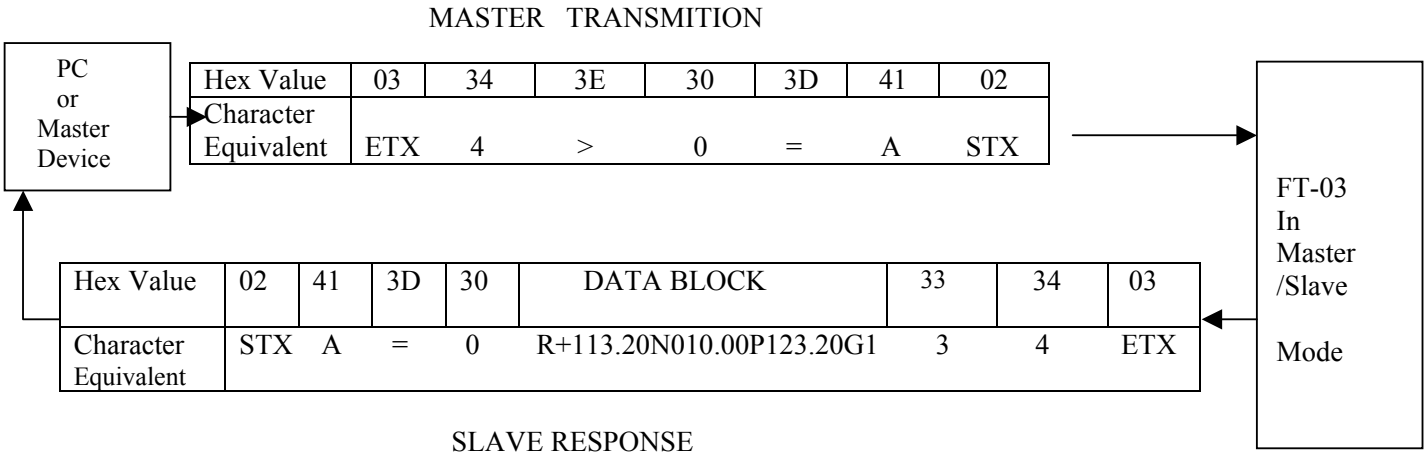
| BYTE | NAME | DESCRIPTION |
|---|---|---|
| 1 | WEIGHT STATUS | Bit0 0=NORMAL 1=NO WEIGHT DISPLAY<br>Bit1 0=GROSS 1=NET<br>Bit2 0= 1=AUTO ZERO<br>Bit3 0=WITHIN RANGE 1=OUT OF RANGE<br>Bit4 0=NO STANDSTILL 1=STANDSTILL<br>Bit5 0=NORMAL 1=UNDER MIN. WEIGHING RANGE<br>Bit6 ALWAYS 1 TO OBTAIN PRINTABLE CHARACTERS<br>Bit7 ZERO OR PARITY |
| 2 | POLARITY | "+" OR "-" |
| 3-8 | INDICATED WEIGHT | 6 DIGITS DEPENDING ON FT-03 SETUP INCLUDING DECIMAL POINT IF ANY OF THE PRIMARY DISPLAY |
| 9 | "N" | N STANDS FOR NET WEIGHT. IT WILL BE EQUAL TO THE GROSS WEIGHT WHEN THE TARE VALUE IS ZERO. |
| 10-15 | TARE | 6 DIGITS DEPENDING ON FT-03 SETUP INCLUDING DECIMAL POINT IF ANY |
| 16 | "T"/"P" | 'T' STANDS FOR TARE WHEN THE TARE WAS MANUALLY SET AND 'P' FOR PRESET TARE. |
| 17-22 | GROSS WEIGHT | 6 DIGITS DEPENDING ON FT-03 SETUP INCLUDING DECIMAL POINT IF ANY. THE GROSS WEIGHT. |
| 23 | "G" | G STANDS FOR GROSS WEIGHT |
| 24 | "SN" | SN STANDS FOR SCALE NUMBER |

Setup Requirements:

Set through SYSTEM\SET\2COM\OPERATION\M/S

Sam**ple execution:**

Suppose the primary display indicates 123.20kg and the Tare value is 10.00kg and it was a preset tare.
The address of Slave is “A”.


MASTER TRANSMITION
PC or Master Device
Hex Value 03 34 3E 30 3D 41 02
Character Equivalent ETX 4 > 0 = A STX
FT-03 In Master /Slave Mode
Hex Value 02 41 3D 30 DATA BLOCK 33 34 03
Character Equivalent STX A = 0 R+113.20N010.00P123.20G1 3 4 ETX
SLAVE RESPONSE

## 2. TARE PRESETING VIA A PC

This FT-03 version features the possibility to preset its TARE remotely via a PC. This is done by utilizing the LESIP protocol and its commands. To do that the device must be programmed in the following way:

From SYSTEM\SET\2COM\M/S the KEYBOARD COMMANDS must be ENABLED.
The command for Taring the device is ‘T0’ and it has the following LESIP format:

**|STX|Addr|T|0|XXXXXX|BCS2|BCS1|ETX|**

Where XXXXXX, the TARE WEIGHT, is the 6 digit required tare.

For example if XXXXXX is and no decimal point:

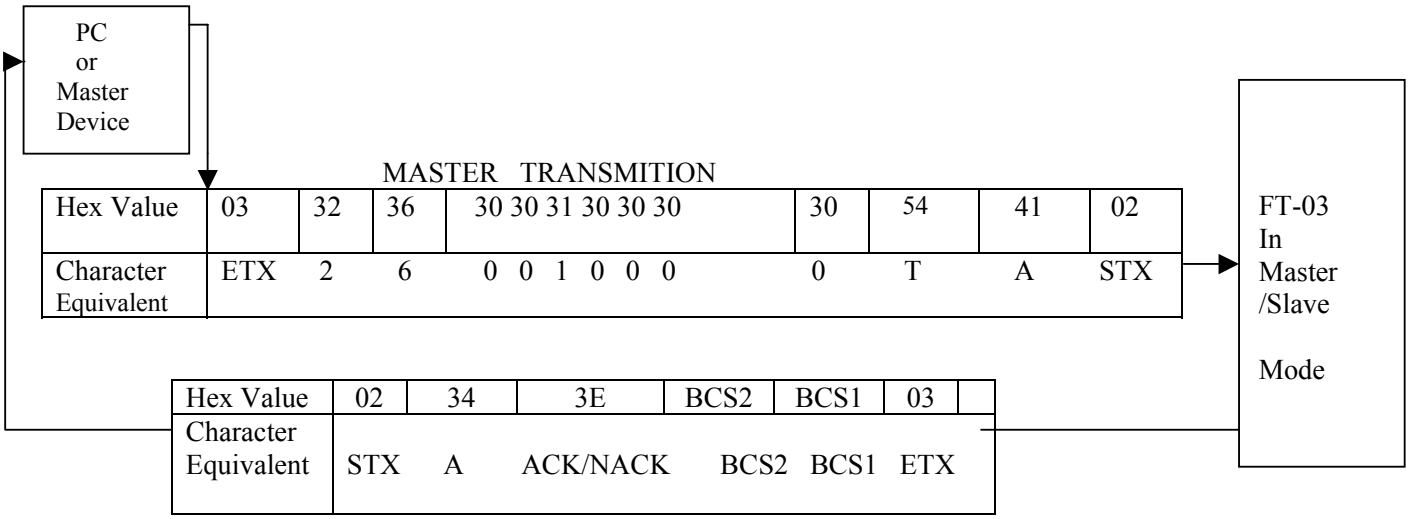
000010 then the required tare is10 kilograms.
000100 then the required tare is 100 kilograms.

If the scale is set to accuracy of 1 decimal point then if XXXXXX is:

000010 then the required tare is 1 kilogram.
000100 then the required tare is 10 kilograms.

**Sample execution**:

Suppose the primary display indicates 123.20kg the required preset tare is 1.0kg. The address of Slave is “A”. To tare the device the following command must be issued:




If the command is recognized then the FT will reply with an ACK command string and the scale will be tared showing a net weight of 122.20 kg.

Otherwise the FT will reply with a NACK string and the scale will not be tared.

## 3. COM1 and COM2 new Alibi System

Up to this software version, COM1 port had to share the address of COM2 when in Alibi mode. For example if COM2 was in Master/Slave mode with address A, then COM1 would have to reply to the ‘A’ character to store the Alibi. In this version the user can program a separate address for COM1 mainly for Alibi purposes but also for other possible future uses.

The programming is done via the menu SYSTEM\SET\1COM\ADDRESS. Set address according to your requirements.